WIRE
& WIRE PRODUCTS

NOW that the turn in business is definitely apparent . . . let's face the facts . . . prices are not going to change for some time to come . . . each manufacturer must operate at a profit or his place in the sun cannot be maintained for long . . . your major problem, therefore, is to produce a consistently better product for less money . . . can you do it with your present equipment? Vaughn engineers will welcome the opportunity of discussing this vital problem with you. The Vaughn Machinery Company, Cuyahoga Falls, Ohio.

● Manufacturers of Motoblocs (Single or Double Deck), Vaughn-Nullmeyer and Continuous Machines; also equipment for pointing, patenting, galvanizing, tinning, etc.

May 1933

1. SERVICE

Carboloy *Mobile* Service Units, operating out of Chicago, Detroit, Newark and Pittsburgh, are available for service and manufacturing work on Carboloy dies in plants throughout the Eastern and Mid-western States. These service units are brought into your plant by experienced operators who fit the dies to the job and see that they work before they leave.

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Savings in investment cost may be obtained by the user by purchasing moulded nibs in casings and finishing them in his own plant. These nibs are moulded to within + or − .005 of the specified rough hole size and require the removal of only a few thousandths of material to finish.

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A standard range of die nib and casing sizes, with established specifications for each size. This makes possible a reduction in equipment, such as die holders, necessary to use these dies throughout their range of sizes.

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CEMENTED CARBIDE DRAWING AND EXTRUSION DIES

HADDOW

Does It Again!

Here is the result of a test made April 13th on the new Haddow machine for cutting alloy dies before five representatives of some of the largest wire manufacturers.

ONE had brought a new tungsten carbide die, rough nib, with copper wire drawn through it it measured .0365 and .0399.

✦ ✦ ✦

THE spindle of the machine is hollow, a piece of ¼ in. round cold rolled steel, tapered both ends, was passed down thru the spindle and held in a chuck on the spindle, the spindle and the die were tipped to the angle required, and using 280 grain boron carbide, the angle was clean in one minute, but because the straight hole for the bearing was about ⅛ in. long it took five minutes more to make the taper hole clear through the die.

✦ ✦ ✦

THE die then measured .0381—.0404, the tapered end of the rod was still smooth and worn very little.

✦ ✦ ✦

THEN the spindle and the die holder were set vertical, a piece of .040 dead soft brass wire was pulled through the die, then, still using the same boron carbide, the machine was run 2 minutes, the die measured .0415—.043.

THEN .045 dead soft brass wire was pulled through the die and the machine run one minute, die measured .047—.0473.

✦ ✦ ✦

THEN .051 dead soft brass wire was pulled through the die machine, run one minute and the die measured .0552—.0555.

✦ ✦ ✦

THEN .057 dead soft brass wire was pulled through the die and the machine run ½ minute and the die measured .0598—.060.

✦ ✦ ✦

THE grade of boron carbide was next to the finest made but the machine cuts so fast that only one grade is required, the surface left is so smooth that by repeating the operations, reversing the pointed rod and using No. 7 diamond dust and cutting about 3 minutes on the angle and about ½ minute on the bearing, the die is .063 and has a beautiful polish.

✦ ✦ ✦

THEN a piece of soft wire, a shoe string or anything flexible is held vertically in the two chucks, after having been pulled through the die, the wire revolves or not, as you please, the the die is tipped to polish the entrance and the die is fed toward the wire, in in either direction, and the sharp edges are rounded off and the die is finished on the machine and no hand work used.

✦ ✦ ✦

THE machine using a shoe string and No. 7 diamond dust, while polishing a .114 die cut seven tenths in the bearing in six seconds.

✦ ✦ ✦

A die .235 was put into the die holder, this die had an internal gear in it from having been left in the wire machine too long, a piece of cold rolled steel placed in the chucks, vertically, the die tipped until the angle hit the rod and after starting the machine using same boron carbide, the die was fed toward the rod and after the angle was cut clear through the die, and the gear removed, the rod was examined and the surface of the three sixteenth rod was as smooth as the original rod and was reduced in diameter less than one thousandth.

THE machine with 280 boron carbide will cut a die ten thousandths a minute, has recut a .064 diamond one tenth a minute, using drill rod, cut in two, no pointed tools are required, the straight rod cuts the angles and the bearings equally well and fast, has been used down to .032 with a darning or knitting needle for a cutting rod.

✦ ✦ ✦

It does not tear the pointed tools, one pointed end will cut a new tungsten carbide nib clear through the die and still be smooth and show practically no wear as compared with the present practice.

✦ ✦ ✦

The price is $450.00, F O B Newark, N. J.

Complete with ¼ h. p. motor, G. E. Heavy Duty

Manufactured by the Ruesch Machine Co., Newark, N. J.

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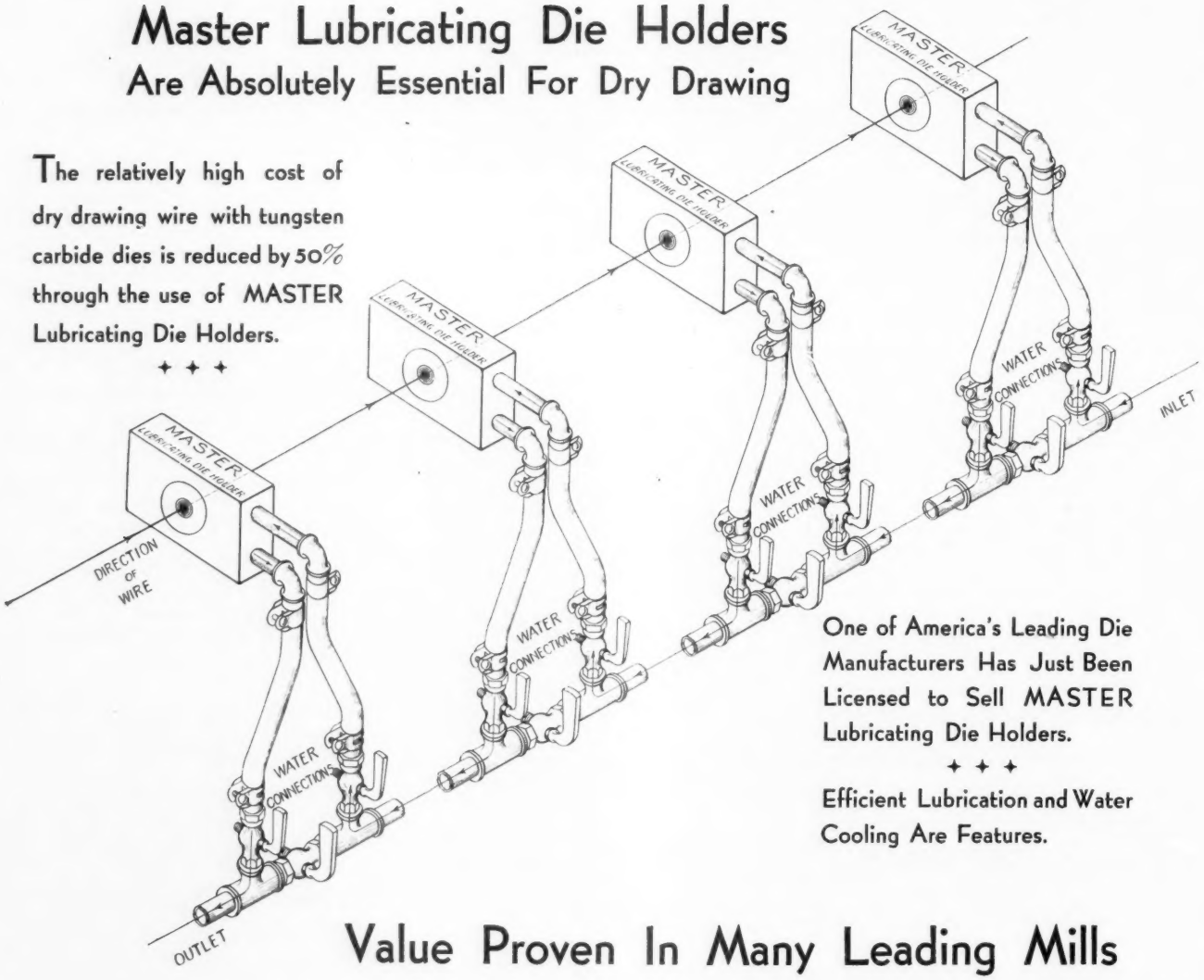
✦ ✦ ✦



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✦ ✦ ✦

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WIRE & WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip. Wire Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING.

Vol. 8 May 1933 No. 5

Designated as
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Improvements in processes and methods of production for rod, wire, strip and insulated wire and cable are being constantly made.

Manufacturers of materials, tools and equipment also are making additions and improvements to their lines.

Technical processes of production are being developed consistently.

To members of the Wire Association an information service is available by which they can obtain data on any subject relating to the industry on which they desire information.

WHY DON'T YOU JOIN THE WIRE ASSOCIATION?

ADDRESS THE SECRETARY,

Richard E. Brown, 17 E. 42nd St., New York, N. Y.

WIRE & WIRE PRODUCTS, Vol. 8, No. 5, May, 1933. Executive office, 17 East 42nd St., New York, N. Y. Published by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secretary and Treasurer. Publication office, 49 E. Washington Ave., Washington, N. J. Subscription price: U. S., $5.00; Canada, $5.60 per year, 50 cents per copy; Foreign, $7.50 per year. Entered as second class mail at the Post Office, Washington, N. J., under Act of March, 1879.

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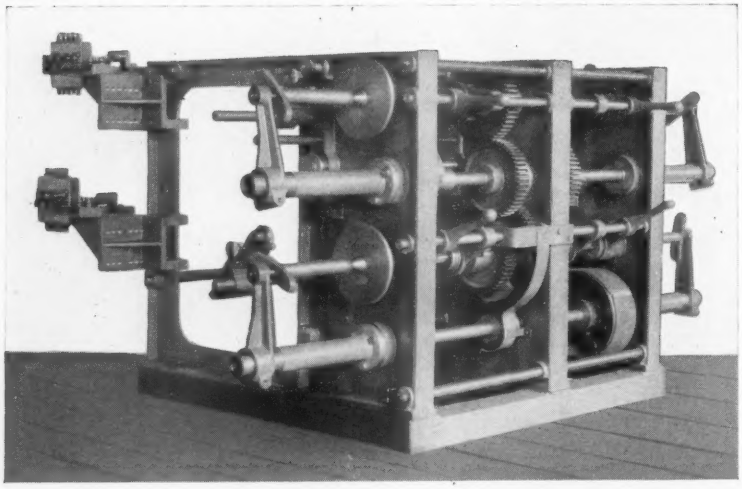
HERE'S A SPOOLER WITH ADAPTABILITY



For years Wire Mill men have been frequently faced with spooler jobs beyond the capacities of their equipment.

The above spooler solves this problem. It has capacity. It will straighten and wind wire on its four spools closely and smoothly. It will take any spool up to 10″ wide and 10″ diameter provided the hole is ¾″ or larger. It will handle either flat or round wire from No. 23 (.025″) to No. 16 (.062″).

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A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 8 MAY, 1933 No. 5

Mordica Reelected President of the Wire Association

L. D. Granger, Asst. to Vice-Pres., Wickwire Spencer Steel Co., and J. Carlton Ward, Jr. General Wks. Mgr., General Cable Co. elected Vice-Presidents. Richard E. Brown, "Wire and Wire Products," Secretary and Treasurer.

THE annual directors meeting of of the Wire Association was held at the Hotel New Yorker on Friday, April 14th at 10 A. M. and immediately after the directors meeting there was an informal luncheon at which about twenty-five representatives of the wire industry were present.

✦ ✦ ✦

THE Secretary reported a more satisfactory financial condition and material gain in the membership despite the generally adverse business conditions which had existed during the past year.

✦ ✦ ✦

UNDER the resolutions adopted at the annual meeting held at Buffalo, October, 1932 under which it was necessary to rotate the terms of office of the directors, the following directors retired:

Fred M. Crapo, Vice President of Mfg., Indiana Steel & Wire Co., Muncie, Indiana.

Herbert Horsfall, President, Canada Wire & Cable Co., Toronto, Ontario, Canada.

W. F. Knoll, Supt., James Pender & Co., Ltd., St. John, N. B. Canada.

Wire Association to hold 1933 meeting at Detroit during week of October 2nd with technical sessions on Oct. 3rd, 4th and 5th. All meetings to be held at the Book-Cadillac Hotel. There will be a Wire exhibit section in connection with the National Metal Congress Exposition.

L. A. Vaughn, President Vaughn Machinery Co, Cuyahoga Falls, Ohio.

R. B. Whyte, Gen. Supt., MacWhyte Co., Kenosha, Wisconsin.

✦ ✦ ✦

PRIOR to this meeting new directors were elected by a mail vote of the Association as follows:

Non-Ferrous Group

E. W. Clark, Managing Eng. Wire Dept., General Electric Co., Schenectady, N. Y.

John R. McKean, Supt., Asst. Mgr., American Electrical Wks., Phillipsdale, R. I.

J. C. Ward, Jr., General Works Mgr., General Cable Corp., Rome, New York.

Steel and Ferro Alloys Group

Geo. A. Paff, Supt. Rod & Wire Dept., Wheeling Steel Corp., Portsmouth, O.

E. P. Kastien, Purchasing Agent, Keystone Steel & Wire Co., Peoria, Illinois.

✦ ✦ ✦

WITH the changes as mentioned above, the Board of Directors for 1933 consists of the following:

C. S. Barningham, Sales Mgr., New England Butt Co., Providence, R. I.

R. E. Brown, Publisher, WIRE & WIRE PRODUCTS, 17 East 42nd St., New York, N. Y.

John C. Callaghan, Works Manager, Canada Works, Steel Co., of Canada, Ltd., Hamilton, Ontario, Canada.

E. W. Clark, Managing Enginer, Wire Dept. General Electric Co., Schenectady, N. Y.

Ralph K. Clifford, General Supt., Continental Steel Co., Kokomo, Indiana.

L. D. Granger, Asst. to Vice-President, Wickwire Spencer Steel Co., 41 East 42nd Street, New York, N. Y.

Geo. D. Hartley, Treasurer & General Mgr., Sleeper & Hartley, Inc., Worcester, Mass.

E. P. Kastien, Purchasing Agent,

Keystone Steel & Wire Co., Peoria, Ill.

Kenneth B. Lewis, Consulting Engineer, 43 Midland St., Worcester, Mass.

John R. McKean, Asst. Mgr., American Electrical Wks., Phillipsdale, R. I.

John Mordica, Supt. Rod & Wire Works, Bethlehem Steel Co., Sparrows Point, Maryland.

Geo. A. Paff, Supt. Rod & Wire Dept., Wheeling Steel Corp., Portsmouth, Ohio.

W. D. Pierson, Secretary, Waterbury Farrel Fdry. & Machine Co., Waterbury, Conn.

J. C. Ward, Jr., General Works Mgr., General Cable Corp., Rome, N. Y.

✦ ✦ ✦

1933 Meeting Will Be Held at Detroit

IT was voted that the Wire Association would hold its 1933 meeting at Detroit, Michigan during the week of the National Metal Congress, Oct. 2 to 7 inclusive but that its technical sessions would be limited to three days, Tuesday, Oct. 3, Wednesday, Oct. 4, and Thursday, Oct. 5.

✦ ✦ ✦

Outline of Sessions

IT was further decided that the Tuesday session would be devoted to steel and ferro alloys; that the Wednesday session would be held jointly for the benefit of the steel and ferro alloy group and the copper and non-ferrous group, and that the Thursday session would be devoted to the interests of the copper and non-ferrous group.

✦ ✦ ✦

THE sessions will be arranged for mornings only with the idea that they can carry through to the afternoon if desired by those present.

✦ ✦ ✦

THE annual Wire Association meeting will be held on Wednesday, Oct. 4th immediately after the meeting of the joint groups. Following this a plant inspection trip will be made, the details of which will be announced later in the columns of WIRE & WIRE PRODUCTS and by mail to the members.

✦ ✦ ✦

THE same form of discussion program carried out in the 1932 meeting so successfully will be followed. That is, all papers will be published in the October issue of WIRE & WIRE PRODUCTS and each man in attendance will receive a copy of these papers the day before the meeting is held.

JOHN MORDICA

President—The Wire Association

1931-1932-1933

John Mordica, the first president of the Wire Association, is a practical wire man.

JOHN MORDICA

Supt. Rod & Wire Mill, Bethlehem Steel Company, Sparrows Point, Md.

After serving his apprenticeship as a wire drawer he worked in several different plants in which widely different wire products were made with the idea of learning all about all kinds of wire. This combination of technical and practical wire knowledge brought him up to be superintendent of the Independent Steel & Wire Co., Kenova, W. Virginia until 1921. Then he accepted the position of general foreman of the Wire Mill with the Cambria Iron Co., Johnstown, Pa. This company was later taken over by the Bethlehem Steel Co. Mr. Mordica worked up to be Assistant Superintendent. In 1925 it was decided to build the plant at Sparrows Point, Md., and Mr. Mordica was selected as Superintendent of this. During the erection of the entire plant he acted in an advisory capacity to the Engineer in charge and with the opening of the plant as operating Superintendent.

THE speaker at the meeting will give a brief resume of the contents of the paper and the entire meeting time will be spent in open discussion.

✦ ✦ ✦

The Program Committee

The program committee consists of:

Ralph K. Clifford, General Supt., Continental Steel Co., Kokomo, Indiana.

Kenneth B. Lewis, Wire Mill Engineer, 48 Midland Street, Worcester, Mass.

W. D. Pierson, Secretary, Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

E. W. Clark, Managing Engineer, Wire Dept., General Electric Co., Schenectady, N. Y.

✦ ✦ ✦

Meetings and Exhibits

THE headquarters of the Association will be at the **Book Cadillac Hotel** and all meetings will be held there.

✦ ✦ ✦

THE exposition sponsored by the National Metal Congress, which is a joint exposition of the several societies holding their meeting at Detroit simultaneously, will contain a Wire Section in which there will be exhibits pertaining directly to this industry.

✦ ✦ ✦

Registration Fee and Charge For Proceedings

IT was further decided that the policy of having a registration fee of $5.00 for each person attending the technical meetings which was instituted at the 1932 meeting will be followed again this year and that the policy of having the proceedings published in printed book form and sold at $2.50 per copy will also be followed.

✦ ✦ ✦

Membership

IT was decided to embark upon an active membership drive within the near future and a membership committee will be appointed and an announcement of the personnel will be published in WIRE & WIRE PRODUCTS in the next issue.

Watermarking Paper

By Clarence Beebe

Eccentric and Outlined Watermarking by Wires on Paper While in the Process of Manufacture

HOLDING a piece of white paper to the light one may observe many distinguishing peculiarities throughout its area. These demonstrate that Wire again enters into the manufacture of paper in other phases than in the factor of a large sheet of wire cloth upon which the web of paper pulp is formed and carried upon the surface of a Fourdrinier or Cylinder machine. A close observation of this exposed piece of paper will

show faint tracings of the wire cloth and also of the felt upon which the paper pulp has come in contact.

Other distinct markings are made from the impost of wires attached to and surrounding a Dandy Roll. These impressions are many in kind and are made from a so-called "wire laid mark" on book papers to elaborate designs to advertise the maker of the paper.

✦ ✦ ✦

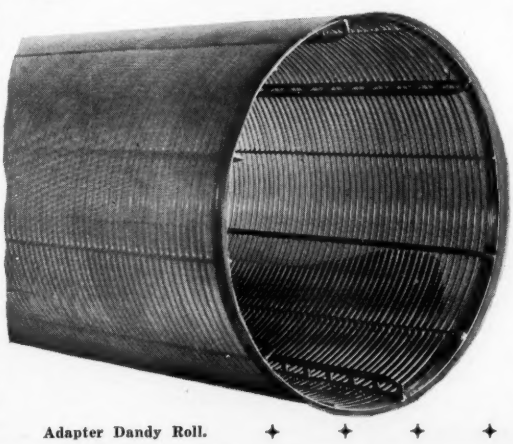
THE laid mark is made of parallel wires with a connecting wire every inch or two, and is generally used in thick weight papers. Other markings consist of wording or lettering registered names for the grade of paper in question, with some design such as an eagle or the outline features of some prominent and well known man.

✦ ✦ ✦

THESE wires are placed on the surface of the Dandy Roll and fastened to the body of the roll. This roll extends entirely across the machine at the wet end and as it revolves leaves the desired impressions on the wet pulp.

✦ ✦ ✦

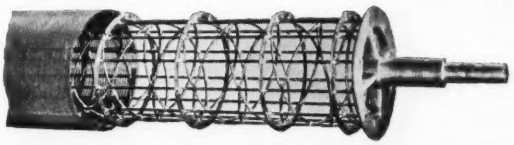
DANDY Rolls were used as early as the year 1750, but were quite different from the Dandies of today. The first dandy roll was made of wood and its name originated from its inventor's smart appearance. Then came the metal covered wooden dandy. This was considered the thing as the dandy kept a better shape because the water could not warp the wood. In the early years of the nineteenth century the development of a successful machine for the commercial production of paper had reached a point where a better dandy roll was needed and the all metal dandy was invented. Its construction consisted of a series of brass wire rings soldered together.



Adapter Dandy Roll.

✦ ✦ ✦

IN 1885 there was put on the market a new type of Roll known as the TRUSS DANDY, the construction being in the nature of a trestle work which made a much stronger roll. The principal feature of this Roll is a rigid removable cover, and it has the advantage of being more easily cleaned. Brass wire in various forms enters very largely into the construction of Dandy Rolls and constitutes at least ninety per cent. The accompanying cuts show the latest Adapter Dandy Roll with plain 50 mesh wove cover. The removable frame shown is what the wire cloth cover is put on. Any mesh wire cloth desired can be used. For fast running machines a coarse mesh cloth is used. For fine papers such as bonds and ledgers a finer cover is desirable. Shaded marking is made by pressing the form into the cloth, low spots show dark and high spots show light. The roll is revolved by the running wire cloth on most machines. Where a very large roll is used, such as a 20″ or 24″ diameter roll an independent belt is used to drive it. It might be mentioned here that the wired watermark has frequently been instrumental in detecting crime, where the criminal has used the paper. The use of wire in the paper mak-



Removable Frame.

✦ ✦ ✦ ✦ ✦

(*Please turn to page 155*)

Wires for Making Nails

By A. Mai, Works Manager
Germany

A description of the latest German methods of manufacturing wire for nail making as translated from Draht-Welt.

AS a rule not much attention is given to the quality of the wire in the manufacture of nails, providing it is not a question of making certain kinds of nails and tacks which demand a certain quality of wire on account of their purpose of use or their method of manufacture. This side of nail manufacture nevertheless requires consideration as every nail, irrespective for what purpose it is intended must meet certain determined requirements, not only as regards its appearance, but also as regards hardness and possibility of use for the desired purpose.

✦ ✦ ✦

SPECIAL tacks, such as all kinds of shoe tacks, pins, sole tacks and also tube nails and roofing felt pins, besides many other shaped tacks require the employment of a material treated in a certain manner, both as to quality and with consideration of further treatment in the annealing department, pickling and wire drawing, as in these kinds of nails a whole series of factors come into question which must be taken into consideration during the manufacture and employment.

✦ ✦ ✦

IT is a different matter in the case of the wire pins of all kinds, such as are used in the furniture and building trade and also for ordinary purposes. Special nails and tacks require careful manufacture and consequently command a higher price. The demand is however not so large that a mill could restrict itself only to the manufacture of these kinds, at least not on a large scale, but every mill with very few exceptions has a mixed production. Owing to the simple manufacture and the possibility of producing large quantities of wire nails, these are very cheap so that they can only be profitable when made in large quantities, and even then only by utilising to the full extent all possibilities in all branches of manufacture.

✦ ✦ ✦

CONSEQUENTLY the cheapest wire is employed for wire nails as high quality wire would prevent their manufacture being profitable. In all other manufacturing branches the expenses must be reduced to a minimum, especially in the wire drawing. In this connection it is fortunate that particularly tack wire allows of quick passes. The harder the wire is, the better will be the wire pin and complaints from consumers concerning the lack of hardness of the wire nails are very numerous, the nails bend when being driven into hard wood and for this reason in Northern Countries—Sweden, Norway, Finland — square section wire nails are preferably employed which naturally do not bend so easily. However even this kind of nail is not absolutely reliable and the wire, both for round as also for square nails must not be too soft.

✦ ✦ ✦

THOMAS wire is generally employed for wire nails, but wires of other quality are also used, which for some reason or other are not suitable for the purpose for which it was intended, for example dull or rough coils. These are easily mixed by machines with wire of harder quality with the result that wire nails of unequal hardness are to be found in one and the same packet. This objection can however be overcome if such coils are only used for short sizes. Some consumers prefer the wire nails of certain firms because they know that they will find uniform hardness.

✦ ✦ ✦

RAPID passes necessitate certain lubricants. The most suitable and cheapest method is the drawing in grease as this, owing to the lime adhering to the rolled wire, repeatedly reforms and only when it becomes too thick by too high percentage of lime, need it be diluted with a small quantity of colza oil and grease. A waste of colza oil or grease cannot occur as the wire immediately reacts by hard running in the event of too strong dilution of the lubricant. Nail wire, besides being drawn in grease, may also be drawn in soap or wet, but this latter method is more expensive and open to certain objections on the wire nail machine, which objections will be hereinafter mentioned.

✦ ✦ ✦

GREASE drawn wire is less sensitive to moisture, allows of longer storage and in rooms which are themselves not suitable corrosion is prevented for the longest possible time. Every expert knows how disadvantageous particularly rusty wire is for the machine tools. Moreover the grease coating increases the life of the tools to a considerable extent as this coating becomes liquid through the mechanical heat and effects an automatic lubrication of the cutting surfaces. Further the scouring of the wire nails of grease drawn wire is more rapid. Thus it presents a considerable number of advantages.

✦ ✦ ✦

THE drawing in soap allows of still more rapid passes with higher speeds of rotation. However this only pays when drawing thin wires as the soap skin on the

wire is comparatively thick. Soap drawn wire is not advantageous for the manufacture of pins.

✦ ✦ ✦

THE surface of the wire becomes gray and dull under the influence of atmospheric moisture already within a few days and the wire is liable to a greater extent to the formation of rust.

✦ ✦ ✦

A TALLOW-like mass forms on the machine in conjunction with oil, which mass hardens owing to the mechanical heat clogs the tools. This crust can be dissolved by supplying oil, but after a short time the tools are so covered with soap that they must be cleaned. The coating and soaping over can be prevented by passing the wire through a petroleum vessel arranged in front of the draw plate; this however means a considerable increase of expense besides saturating the work-room with disagreeable petroleum fumes.

✦ ✦ ✦

THE scouring process of the finished nails lasts longer as the alkalis adhering to the nails retard the polishing.

✦ ✦ ✦

SOAP drawn wire cannot be employed at all for the manufacture of sole tacks as the wire is worked under strong lubrication in a series of operations which each require a separate group of tools. In this instant the soaping is very considerable as, owing to the fewer and lighter passes, the soap coating adhering to the wire is comparatively thick.

✦ ✦ ✦

CONSEQUENTLY the advantages of drawing tack wire in soap must be regarded as problematical, whereas the disadvantages are very noticeable when working on the machine.

✦ ✦ ✦

THE drawing in soap nevertheless presents great advantages for a number of wires, but this article is solely intended to show which wires are most suitable for tack manufacture.

✦ ✦ ✦

BESIDES the above mentioned nails made of square section wire, nails are also made from other section wire.

THE section drawing is mostly effected by the wet process with a greater or lesser addition of copper as section wires only allow of light passes and easily bind. Wet drawn wires are generally drawn with an addition of grease soluble in water so that a certain grease layer adheres to the wire. This and the more or less thick copper layer protect the finished wire for a certain time against rust, if properly stored, but the resistance is not nearly equal to that of wire drawn through lubricant.

✦ ✦ ✦

ROUND wires, if subjected to a suitable preliminary treatment, can be drawn to the thinnest sizes in lubricant, but also in this instance there is a limit from which the wire must be further wet drawn. A coating of copper as thick as possible is advantageous for the working on the machine, as the copper layer smooths but is too expensive.

✦ ✦ ✦

AS wet drawn wire has a surface comparatively free from grease, the wire must be lubricated on the machine, preferably by arranging an oil box in front of the admission through which the wire, wrapped with an absorbing rag, passes. The oil consumption cannot be avoided in view of the life of the tools, but the quantity of oil carried off by the wire, dependent upon the cross section of the wire, is not great. The oil box on the machine does not obstruct and when working wire drawn in grease can remain without being used. Particularly hard wire is necessary for long, thin tacks, whereas this wire is mostly subjected to an intermediate annealing and softer than it should be, in view of the machine tools.

✦ ✦ ✦

TACK wire can never be too hard or never hard enough. By employing suitable steel for the tool, these can be made at least as durable as the tools usually employed for softer wires. Consumers who continually use wire nails attach more importance to the quality and suitability of the goods than one is inclined to believe. For example round section nails find practically no market in the Northern Countries. Firms attaching particular value to obtaining the greatest possible hardness for their wire nails will find that their products are preferred.

✦ ✦ ✦

IN the case of special nails with wide flat heads the employment of hard and brittle wire is impossible as the heads break off and cannot be sufficiently upset. These nails are however used practically exclusively in short sizes so that the hardness is of no importance.

✦ ✦ ✦

IT must also be pointed out that even the hardest wire nails bend if, as is often the case, these are not absolutely straight in the first instance or if the heads are not at right angles to the shank. No difficulties are encountered with soft wood, but great trouble occurs with knotty or hard wood.

✦ ✦ ✦

IT is practically unknown fact in inexperienced circles that nails can be driven into hard wood with light but central blows without their bending, as is usually the case.

✦ ✦ ✦

FROM the above it will be seen what important factor the employment of the hardest possible grease drawn wire is in the manufacture of wire nails. The drawing of wire nails by the wet process or through soap should be limited to those kinds for which the drawing through fat presents difficulty. If scrap wire and similar different qualities are worked, these should preferably be kept separate and employed for short sizes in order to make quite sure that useful, uniform products can be offered.

✦ ✦ ✦

WILLIAM S. THOMPSON

American Steel and Wire Co.

William S. Thompson, who for many years was assistant to the president of the American Steel & Wire Company in Cleveland, died recently at his home in Evanston, Illinois. Mr. Thompson was 75 years old and was well known among steel men, both in Cleveland and throughout the trade. He retired about two years ago when A. F. Keefe was president of the Steel & Wire Company.

Handy Aides to the Wire Man With the Use of the Slide Rule

C. B. S. Jackson, Wire Mill Engineer
Worcester, Massachusetts

THE data issued by the manufacturers of wire drawing machinery, wire drawing dies and others, pertaining to foot/pounds, pounds/foot, area and tensile strength, etc., is very valuable to the wire man but as this is not always available it is handy to know how this data was computed by the use of the slide rule.

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THERE is a lot of satisfaction derived from making wire with the slide rule. Rejections are few, scrap is nil and altho the tonnage cannot be weighed up on a wire buggy it looks fine on paper.

✦ ✦ ✦

THERE are of course many other uses to which the rule may be put such as converting Metric to English measure, Centigrade degrees to Fahrenheit, H. P. to KW etc., but the following are every day occurences where the use of the rule is helpful.

✦ ✦ ✦

Circumference

Set No. 1 on B to 3.1416 on A.

Find cir. on A over diameter on B.

For example. You wish to find the circumference of a 22 inch block.

With No. 1 on B to 3.1416 on A. Over 22 on B find 69 on A.

Cir. equals 69 inches.

✦ ✦ ✦

Area

Set No. 1 on C over diameter on D.

Find area on A over .7854 on B.

✦ ✦ ✦

Pounds per Foot

Set No. 1 on B under .3749 on A.

Find L/F on B over dia. on D.

✦ ✦ ✦

Feet per Pound

Set dia. on C over 612 on D.

Find F/L on A over No. 1 on B.

Tensile Strength per Sq. Inch

Set 1.2732 on B over dia. on D.

Find T.S on B under breaking load on A.

For example you wish to find the Tensile strength per sq. in. of an .080 wire which broke at 700 lbs.

Set 1273 on B over 80 on D.

Under 700 on A find 140000 on B. Or reverse.

You wish to find B/L of an .080 wire which must have a tensile strength of 140000 pounds.

Over 140 on B find 700 on A.

Mark this point 1.273 on B down through C on your rule so as to always have it handy.

✦ ✦ ✦

Per Cent of Reduction by Drafting

Set LARGE DIAMETER on C over small diameter on D.

Find number on A over No. 1 on B which subtracted from 100 gives you percent reduction.

For example:

A .207 rod is drawn to .080 wire.

Set 207 on C to 80 on D.

Over No. 1 on B find 15 on A which subtracted from 100 gives you 85 or 85% of reduction.

It is a handy way to figure drafts for wire drawing. For example you wish to draft a wire in 35% reductions:

Set No. 1 on B under 65 on A (100 minus 65 is 35%).

Under 162 on C find 131 on D.

Under 131 on C find 106 on D.

Under 106 on C find .0855 on D.

✦ ✦ ✦

THE slide rule may be used to advantage to figure the percent of acid for the cleaning tubs.

Set No. 1 on C to cubic capacity in feet of tubs on D.

Under .77 on C find number on D which will be 1% acidity by weight for 60 degree sulphuric acid.

You wish to run your tubs 3, 5 or 7%.

Set No. 1 on C to the 1% figure obtained on D.

Under 3-5 or 7 on C find the number on D which will be 3, 5 or 7% acidity.

For example you have a tub 4x4x6 feet or 96 cubic feet to liquor line.

Set No. 1 on C to 96 on D.

Under .77 on C find 73.92 on D which is the weight of 60 degree acid to put in tub to get 1% acidity.

If you want 5% acid.

Set No. 1 on C to this number 7392 on D.

Under 5 on C find 369 on D.

Which is the weight of 60 degree sulf. acid to put in a tub of 96 cubic feet capacity to obtain 5% acidity.

✦ ✦ ✦

SOME of us who were brought up in the wire game under the old time rule of thumb practice are perhaps somewhat adverse to the idea of drawing wire with a pencil, but with the use of some of the later tools given us, we get results quicker, more accurate and at lower cost. We also can prove that some of the old time theories were not far from being right.

Now Ready!
Wire and Wire Products
Buyers' Guide
and
Year Book
of the Wire Association
1933 Edition
LIMITED EDITION
$5.00 per COPY
Place Your Order Now!

Dipping Coils of Enameled Wire

By Waldo Hutchinson

THE statement has been made that "coils" wound with enamel covered wire should not be dipped after insulating, unless a varnish is used that the maker gauarantees will not affect the particular enamel covering used on the wire."

✦ ✦ ✦

Enameled Wire Has Tendency To Soften

THE reason for this statement is that some enameled wires when exposed to the combined action of heat and the solvents used in ordinary insulating varnishes, when treating the coils, have a tendency to soften. When this is the case and the coils are placed in a machine, partial shorts between conductors may be caused by the softened enamel being pushed away. Such a condition is most likely to appear at crossover points of tightly wound coils unless great unless great pains are taken to thoroughly expel the solvent and dry the varnish after treatment.

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THIS, of course, applies especially to enameled wire used without cotton or other covering. But even with the cotton covering when the solvent softens the enamel on the wire, the object of the protection afforded by the enamel is defeated at crossovers and just at the point where it is most desirable to have the best of insulation, owing to the possible chafing from vibration and the movement of the coils during the starting current inrush that takes place every time the motor is started. This movement of coils during starting periods is often the source of more trouble in coils than any other condition.

✦ ✦ ✦

Cause of Troubles

TOO often this trouble has been laid at the door of the winder in the belief that he pounded the coils too hard when inserting them in the stator, since the same effect could be obtained in that way. Grounds to the iron of the machine may also be caused when chafing occurs, and the coils have not been properly treated for the required mechanical strength as well as dielectric strength.

✦ ✦ ✦

Varnish Bases

THERE are different varnishes that are safe to use with enameled wire. One such has a linseed and china wood oil base with suitable varnish gums chemically combined. It uses a solvent of 62 deg. B petroleum naphtha or benzine. This is a very fast evaporating thinner and leaves the surface without a residue. Ths varnish has a baking time of 3 hours on surface at 212 deg. Fahr. It also bakes nicely at lower temperatures or at higher ones that will not injure the tapes used. It will also air dry but slowly at ordinary temperatures. When this varnish is used it provides good dielectrc and mechanical strength, but is not strictly flexible. It becomes acid, water and oil resistant after baking.

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ANOTHER varnish for use with enameled wires is a clear baking varnish as the above, with very good penetrating ability and builds up a heavy coat on one application. It bakes on the surface in about 4 hours at 222 deg. Fahr. When baked it has good dielectric and mechanical strength, good bindng and cementing qualities and highly acid, water and oil resisting. With it a solvent of 60 deg. B benzine can be used or a good grade of gasoline.

New Electron Tube Device Locates Cracks in Wire and Tubing

FLAWS and cracks in tungsten or molybdenum wire, copper tubing, and similar materials, are detected by a new vacuum tube oscillator developed by the General Electric Company. This device has already been found of great value in the manufacture of General Electric products where the visual detection of small defects is a very slow process, requiring extreme care, and is often entirely inadequate.

Although orginally designed to locate longitudinal cracks in tungsten or molybdenum wire, the device is being successfully used in the General Electric shops to find flaws in copper tubing. In both cases, flaws are detected by means of eddy currents induced in the material inspected.

The tubing test is based upon the change in electrical resistance of a small section of tubing, which occurs when a defect is included in it. Eddy currents are induced in a small portion of the tubing by passing it through a coil connected in a Dynatron Oscillator circuit. Two of these oscillators are coupled together and connected through an amplifier to a loudspeaker and a meter. Each of the oscillators is provided with a coil

(*Please turn to page 152*)

Newark Wire Cloth Company Develops Hydrogen Wire Annealing Furnaces

W. F. Schaphorst, M. E.,
45 Academy St., Newark, N. J.

A NEW and interesting development by the **Newark Wire Cloth Company, Newark, N. J.,** is shown in the accompanying photograph. A battery of their hydrogen wire annealing furnaces is shown in the background. Behind the furnaces, somewhat hidden from view, are racks of spools containing the fine wire as taken from their wire drawing machines which is to be annealed. These wires are automatically run from the spools, through a continuous, horizontal metal tube filled with hydrogen gas under pressure. This hydrogen atmosphere prevents oxidation and thus helps give the annealed wire a clean, smooth, bright surface, free of all spots and discolorations.

PART of the hydrogen filled tube is mounted in an electrically heated (thermostatically controlled) compartment. The remainder of the tube is the cooling chamber. The wire thus travels, in turn, through the heating zone and adjacent annealing chamber, onto the spools (shown in the foreground) at a predetermined rate of speed—all in one continuous operation.

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THE advantages of this arrangement are twofold: First, the annealed wire is wound directly onto spools which go to the looms, eliminating the usual practice of first winding from coils, thereby saving an operation. Second, the quality of wire going directly to the looms is much improved. Not only is the wire uniformly annealed and made perfectly clean and bright, but kinks and abrasion nicks often caused by extra handling are avoided.

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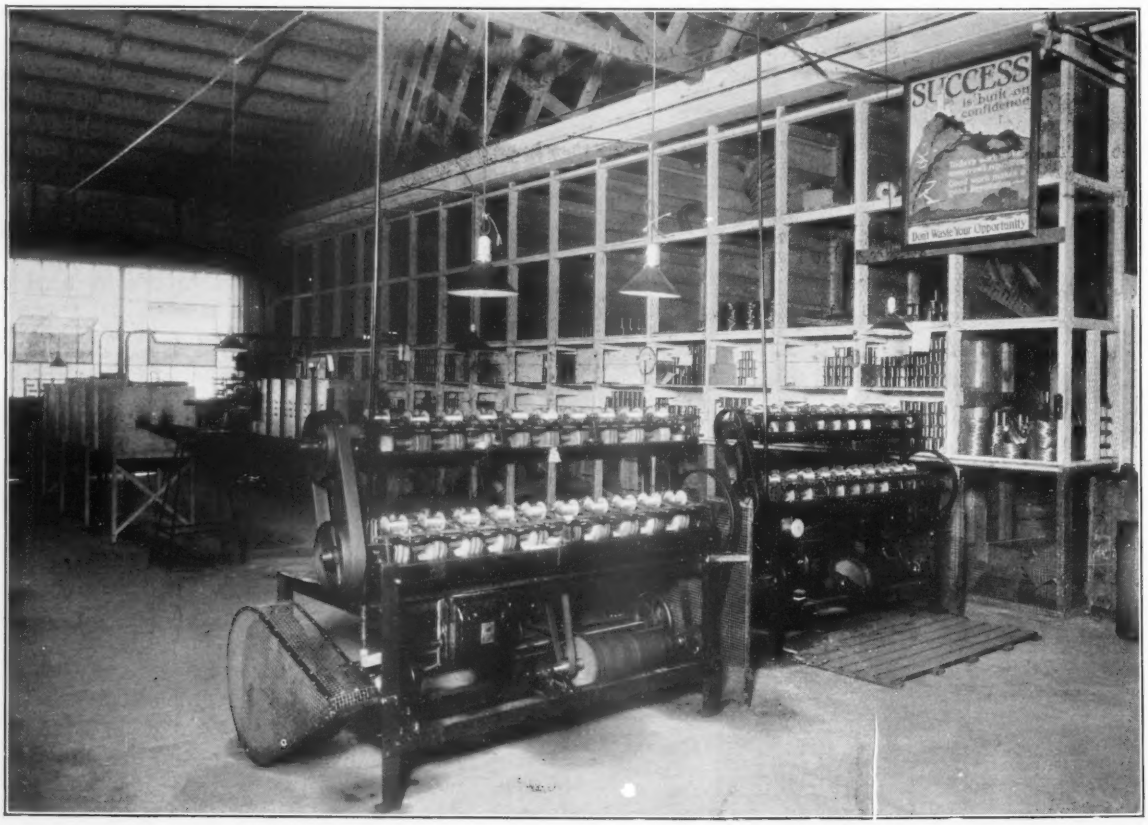
AT this plant, all fine wire must pass through this process before being woven—a factor which makes for quality and economy. This concern manufactures wire cloth for all industrial services, particularly cloth made of copper, stainless steel, monel metal, nickel, molybdenum, aluminum, platinum, silver, phosphor bronze, "Nichrome", etc.



'Round the World With the Wire Industry

Heavy Drop in British Wire Imports

BRITISH trade figures for February reveal some striking results in relation to wire, taking a comparison with the same month last year. Imports of wire dropped from 3,293 tons in February of 1932 to a mere 996 tons; and imports of bolts and nuts dropped from 569 tons to only 168 tons in the same period. Last year being leap year, however, February of 1932 contained an additional working day. On the export side there has been a noticeable improvement in the shipment of wire—from 2,120 tons to 3,121 tons.

✦ ✦ ✦

EXPORTS to the Irish Free State have improved appreciably as a result of the lowering of the duties on metal manufactures which took place at the end of last year.

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British Insulated Cables Report

SIR Alexander Roger, presiding at the recent annual meeting of British Insulated Cables, Ltd., stated that the most important manufacturing development during the past year had been the company's entry into the business of copper refining. It had erected at Prescot, Lancashire, the first large-scale copper refinery in the United Kingdom. Work commenced in January and has since been regularly continued. Production is up to the highest expectations of the firm.

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WHILE the company absorbs the major portion of the output of the refinery, it is already supplying other firms with copper, and expects to do increased business in this connection during 1933.

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THE favorable impression created by the firm's preliminary figures is fully endorsed by the complete accounts. Net profits are practically unchanged at £589,275 ($2,946,375), and the ordinary dividend is maintained at the customary rate of 15 per cent.

Liquidity and strength again characterize the balance-sheet. Debtors, bills, and cash total £1,378,982 ($6,899,910), which is $735,000 ($3,675,000) more than the total of current liabilities, including the final dividend and contingent liabilities. Shares in subsidiaries, at £1,018,456 ($5,092,280), show an increase of £113,000 ($565,000). Sir Alexander Roger and his co-directors have every reason to be satisfied with both the results during a year of crisis and the existing financial position.

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British Report on Cable Research

THE annual report of the British Electrical & Allied Industries Research Association, which has just been issued for 1931-32, states that some interesting research on cables was carried out during the year.

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THE current a given cable can carry without overheating depends on the rate at which the heat developed in the conductor can be dissipated. The nature and condition of the soil around the cable has an important bearing on this point. In laying underground cables it is therefore desirable to know the rate at which heat will pass through the soil (thermal conductivity) so that the correct size of cable can be installed.

✦ ✦ ✦

RESEARCH work carried out last year led to the development of a simple form of test apparatus for the determination of the thermal conductivity of the ground which can be applied along a proposed cable route so that the correct size of cable required to carry the current can be ascertained. Details of this apparatus have been supplied to members of the association.

THE association has for some years past been investigating the fundamental properties of materials used for insulation with a view to improvement in practice and the development of simple methods of test. Experimental investigation into the breakdown of solid dielectrics has also been continued. Recognition of the fact that a large proportion of the failures of electrical equipment, in operation, is due to thermal instability has led to a demand for technical data on the heat conductivity of insulating materials. To meet this demand the association has carried out an extensive investigation, over a period of years. This has led to a series of reports each relating to a separate phase of the work. The most recent addition to this series is a valuable contribution on the passage of heat through wire-wound coils.

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ONE of the most useful insulating materials for industrial applications is cotton fabric surfaced with an oxidizing vegetable-oil-varnish. The value of this material lies in the facility with which it can be wrapped round metal conductors of any shape, size, or cross-section. This material figures largely in a study of fundamental phenomena described in two reports containing a mass of technical data on power loss under different conditions of stress temperature and frequency.

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VARIOUS types of paper are used in large quantities by the electrical industry for insulating purposes, the applications ranging from cables to static condensers and an investigation into the most suitable paper insulators is under way.

✦ ✦ ✦

DURING the year some important cable research was also undertaken by the Research Association of British Rubber Manufacturers, and interesting work of an experimental nature was

'Round the World With the Wire Industry

carried out in the field of cable dielectrics.

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British Place Duty on Diamonds for Wire Drawing

THE British Treasury has approved by Order a recommendation of the Import Duties Advisory Committee that unmounted diamonds drilled so as to be adapted for use in wire-drawing dies should no longer be exempted from the 10 per cent general ad valorem duty under the Import Duties Act. The Order discontinues the exemption as from Thursday, March 16. The Advisory Committee's recommendation is published together with the Treasury Order as Command Paper No. 4269.

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UNDER the Finance Act, 1932, the Committee may recommend that goods of any class or description exempted from the general ad valorem duty imposed by the Import Duties Act, 1932, ought no longer to be so exempted. The Committee has exercised this right for the first time in making the present recommendation referring to diamond dies. The Committee states in its report that, if effect is given to its recommendation, it will subsequently propose, under the Import Duties Act, the imposition of an additional duty of 10 per cent.

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DIAMOND dies are extensively used in Britain in the drawing of the finer gauges of wire, and it is stated that British makers of the drilled unmounted diamonds are in a position to meet almost the entire requirements of the domestic wire industry.

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THE mounted die, which is classified as a machine tool, on importation subject to an aggregate duty of 20 per cent, but the unmounted die is free of duty as being an unset precious stone. The committee sees no sufficient ground for such a differentiation in duty, and considers that both articles should be dutiable at 20 per cent.

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World Famous Cable Expert Retires

PRESIDING at the annual meeting of the Telegraph Construction & Maintenance Co., Ltd., recently held in London, Colin F. Campbell, chairman, eulogized the work done for the enterprise by **Willoughby Smith,** who is retiring after half a century's labor.

"MR. SMITH," stated the chairman, "has been connected with the company for no less than 50 years, and has been a managing director since 1909. I do not think I am making an exaggerated statement in saying that Willoughby Smith is the greatest living expert in submarine cables and the company is immensely indebted to him for the invaluable services he has rendered during the best part of a lifetime. He has always been in the forefront of all development in the manufacture of cables, and it is largely due to him that this company has played so important a part in this branch of scientific research. We cannot complain that he should not wish to law down his arduous duties, and we wish him many years of enjoyment in his retirement."

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C. W. CLARKE, who has been employed by the concern for 43 years, is also retiring. He has been secretary for the past 23 years.

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Great British Iron and Steel Merger Completed

THE protracted negotiations for a merger of Dorman, Long & Co., and the South Durham Iron & Steel Co., have at last been completed. It is officially announced that a provisional agreement has been reached between the directors of the two companies for an amalgamation.

THIS scheme will require the consent of debenture holders and stockholders of the two great undertakings, to whom details of the plan will be submitted shortly. About £18,000,000 ($90,000,000) of capital is involved in this great tie-up of British iron and steel interests, negotiations in connection with which have been proceeding in one form or another for the past six years.

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CHARLES MITCHELL, the present chairman of Dorman, Long & Co., will be the chairman of the merger. Lord Furness, chairman of the South Durham Iron & Steel Co., will not be a member of the board, but Benjamin Talbot, managing director and deputy chairman, will take an active part in the management of the concern, as will also the Hon. Roland D. Kitson and Arthur Dorman, directors of Dorman, Long & Co. The name of the joint concern is likely to be Dorman, Long & Co., Ltd.

✦ ✦ ✦

Lithium Improves Conductivity of Copper

HITHERTO it has always been taken for granted that the electrical conductivity of copper increased with increasing purity. It is now claimed, however, that an increase in conductivity of nearly 4 per cent can be obtained if sufficient lithium is added to copper to produce a binary alloy having a lithium content of from 0.002 to 0.005 per cent. Anything up to 0.1 per cent lithium is introduced into the molten copper to ensure formation of this alloy; the lithium content is readily determined spectroscopically. The lithium is most easily added in the form of a 2 per cent lithium-copper alloy and deoxidation by lithium plays no part in the discovery. The alloy has been patented in the United Kingdom, and it is hoped to introduce the new material on a large scale for cable manufacture.

'Round the World With the Wire Industry

Japanese in Market in India

GERMAN exporters say that the Japanese are working on the credulity of the Indian consumers, criticizing the European wire cartel (IWECO) for maintaining high prices, although European prices are actually lower than heretofore.

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German Wire Cartel

THE German wire cartel reports, that unless the production can be exported in a proportion of more than 50% of the output, the German wire industry cannot produce at a profit. Normally more than 60% of the production is sold for export.

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OUTSIDERS are reappearing on the wire rod market and it is therefore probable that the International wire rod cartel will have to lower the export prices for certain markets. The outsiders are chiefly Belgian and Luxembourgian mills.

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German Reports New Type of Hardened Steel Nails

BLUE annealed hardened steel nails of a resistance against bending, 4 times that of ordinary nails are taking the place of small furniture nails and miscellaneous small wire nails everywhere on the German market. These nails are supplied either with brass, nickel or iron, round or cut heads. In spite of the higher price of these nails, the consumption has greatly expanded and the few makers who specialize in these nails make a good profit. These nails are also being exported, although chiefly to European markets.

✦ ✦ ✦

German Demand for Wire Products

THE Spring demand for wire products is much larger this year than it was at the same time last year. Wire netting and fencing wire have been bought in such large quantities, that some wire netting makers are overstocked with orders and have to refuse further business. The return of confidence, particularly in agricultural districts has induced farmers and stock growers to place orders, which had been postponed for many months. The last report of the industry is very optimistic.

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German Wire Mesh Manufacturers Syndicate

THE efforts to establish a German wire mesh manufacturer's syndicate have been futile and there will be no such cartel. However, it is intended to establish a number of organizations, each including a particular group of specialized manufacturers. As already reported, the German wire mesh industry is specializing its production in such a way, that each manufacturer is concentrating on only one product. The idea is to establish about nine different organizations which, indirectly, would also control the export trade by cooperation with well established export merchants.

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Germany Meeting Japanese Competiton

THE progress of the Japanese industry in India is causing great concern among continental wire manufacturers. The Indian market has been captured very rapidly by the Japanese industry. In December 1932 it exported 425 tons of wire nails to India, out of 994 tons, which is fifteen times more than one year ago, and in January 1933 567 tons out of 1041 tons came from Japan. Further 186 tons of wire out of 1000 tons in December and 197 tons out of 987 tons in January 1933, which is eighteen times more than one year ago, was purchased from Japan.

British Institute of Metals Elects Officers

At the recent 25th. Annual General Meeting of the Institute of Metals, held in London, the following officers were declared to be elected for the year 1933-34:—

PRESIDENT:

Sir Henry Fowler, K. B. E., LL. D., D.Sc.

VICE-PRESIDENTS:

C. H. Desch, D.Sc., Ph.D., F. R. S.

Professor R. S. Hutton, D.Sc., M. A.

MEMBERS OF COUNCIL:

Engineer Vice-Admiral Sir Robert Dixon, K. C. B. D. Eng.

Wesley Lambert, C. B. E., A. K.

H. C. Lancaster.

A. H. Mundey.

A. J. G. Smout.

F. Tomlinson.

The Silver Jubilee Meeting of the Institute will be held in Birmingham from September 18-21. It was in Birmingham that the first general meeting of the Institute was held in the autumn of 1908, under the Presidency of the late Sir William H. White, K. C. B., F. R. S.

✦ ✦ ✦

New Aluminum Propaganda Campaign

FOR some time past an understanding has been in existence between the aluminum industries of Germany, Britain, France, Canada and Switzerland, as is evidenced by the formation of the Alliance Aluminum Cie., of Basle. This concern's sphere of influence covers 85 per cent of the world's production of aluminum, and this world cooperation has led to intense cooperative efforts in the fields of propaganda and research. One of the most active branches of the Alliance is the "Bureau International d'Etudes et de Propagande pour le Develloppement des Emplois de l'Aluminium," of Paris,

(*Please turn to page 151*)

Save on Your

Winding Costs

With Winco PRODUCTS FOURX Enameled Wire

▲ ▲ ▲ All wire meets the most exacting requirements ▲ ▲ ▲

Winco PRODUCTS 4X Enameled Wire has been developed to replace single silk covered and single silk over enameled wire in the winding of small motor armatures, fans, high frequency radio transformer coils and other apparatus where high insulation values and ability to resist abrasion, are prime factors.

▲ ▲ ▲

Winco PRODUCTS 4X Enameled Wire is covered to the same dimensions as the fabric covered wires, and can therefore be wound without changes in armature slots, bobbins or winding jigs.

▲ ▲ ▲

Is superior in its ability to withstand high temperatures.

▲ ▲ ▲

Will withstand softening in the varnish dipping and baking operations.

▲ ▲ ▲

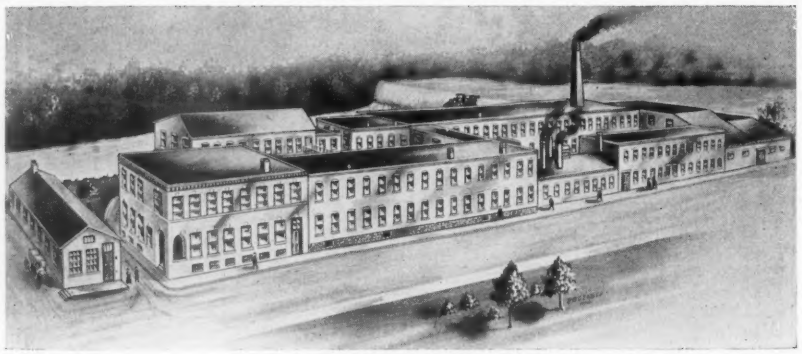
Requires little or no change in winding practice.

▲ ▲ ▲

Costs substantially less than the silk covered wire.

▲ ▲ ▲

Write for samples.



GENERAL VIEW OF PLANT, WINSTED, CONN. ▲ ▲ ▲

Products of leakage currents attack insulation and shorten the life of the coil. ▲ ▲

The only test indicating what the leakage loss in a winding may be is the test in mercury, which reveals the weak spots in the enamel covering. ▲ ▲ ▲

Our method of testing all wire by mercury test before shipment is calculated to give the user the highest degree of protection. ▲ ▲ ▲

ALL Winco PRODUCTS WIRE

GUARANTEED LEAK PROOF ▲ ▲ ▲

We would be pleased to quote on your requirements.

WINSTED INSULATED WIRE COMPANY

Incorporated

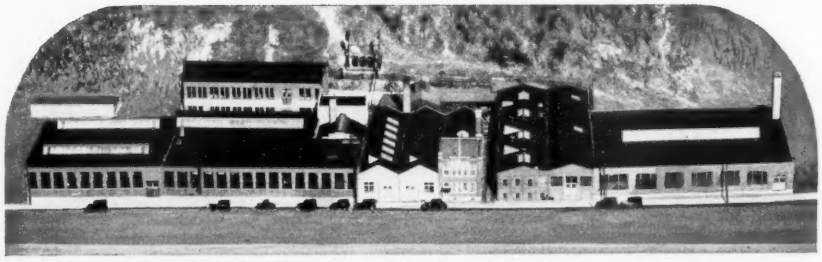
Winsted, Connecticut

"HUDCO" PRODUCTS...

Specially Processed Copper Wire...

For Enameling Purposes...

▲ ▲ ▲ Electrolytic and Oxygen Free ▲ ▲ ▲



AERIAL VIEW OF PLANT OF HUDSON WIRE CO., OSSINING, N. Y. ▲ ▲ ▲
▼ ▼ ▼ FINE WIRE MANUFACTURERS ▼ ▼ ▼

"HUDCO" High Conductivity Electric Wire

OTHER FINE BARE WIRES

High Brass, Low Brass, Zinc 99.99+ and High Tensile Zinc, Commercial Bronze Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Cadmium, 10%, 18% and 30% Nickel Silver, Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification.

BRUSH WIRES, CRIMP and STRAIGHT

Brass, Steel, Nickel Silver, Copper and Phosphor Bronze

TINSEL LAHNS

Silver Plated Copper, False Gold and Copper

METALLIC FIBRE FOR PACKING PURPOSES

Copper, Bronze, Zinc, Lead and Aluminum

Wires for Metal Sprays

Zinc, Tin, Lead, Copper, Commercial Bronze, High Brass, Low Brass, Cadmium, 10% Nickel Silver, 18% Nickel Silver, Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel. Other wires to specification.

"Hudco" copper wire is drawn by the Hudson Wire Company of Ossining, N. Y., who have been specialists in the manufacture of fine wires for over thirty years. ▲

The best grade of copper drawing stock is used, insuring the maximum conductivity. ▲ ▲ ▲

A new process of drawing and annealing is used which produces a wire unusually smooth, clean and uniform in color for enameling and other purposes. ▲ ▲ ▲

Painstaking care in the selection and maintenance of dies guarantees a product accurate to gauge and resistance. ▲ ▲ ▲

You can rely on "Hudco" wire always. ▲ ▲ ▲

Expert annealing of the wire prevents unnecessary breakage when winding the wire into coils. ▲ ▲ ▲

If you, too, have a specific problem demanding wire of exact requirements, write to us about it. ▲ ▲ ▲

It costs nothing and involves you in nothing. ▲ ▲ ▲

Better wire at lower cost. ▲ ▲ ▲

We can serve you quickly and economically.
Send in your specifications for a quotation.

"HUDCO" FINE WIRES

HUDSON WIRE COMPANY

Ossining, N. Y.

Successors ROYLE & AKIN

"HUDCO" FINE WIRES

Estab. 1902 Estab. 1902

Wire Association Questions and Answers

Question No. 1640 - - Nails Made From Wire Drawn On High Speed Continuous Machines.

The Wire Association:

"For some reason or other we have not been successful in making nails from wire drawn on our continuous high-speed drawing machines. All of the trouble that we experience is in connection with the lubricant that is left on the wire. There just does not seem to be enough left so that our dies will stand up. As an example, we can produce approximately 500 lbs. with one pair of knives using wire drawn on slow blocks as compared with 100 lbs. and 300 lbs. respectively when making nails of like size from the same wire but drawn on continuous machines.

Surely there is some solution. I believe that it all lies in the lubricant but such lubricants as we use to get the desired results give us a cleaning or rattling cost that much more than offsets the saving that would accrue through the use of wire drawn on the high-speed machines."

✦ ✦ ✦

Answer No. 1

The Wire Association:

"We have also experienced considerable trouble making nails from certain sizes of wire from continuous machines, so much so that on sizes 15 and 15½ we have found it necessary to discontinue straight drawing and allow the material to cool at 10½ before finishing it.

We are, however, able to make nails from all sizes either above or below these gauges by the use of a lubricant composed of soap, cylinder oil and lime. The trouble with the sizes mentioned seems to be that the cumulative heat of cold working at the heavy draughts used in drawing, creates a temperature at which the coating chars to the extent that it will not furnish sufficient lubrication for the nail knives".

✦ ✦ ✦

Answer No. 2

The Wire Association:

"After doing a little research work of my own on this subject I find that wire drawing soap powder made from a tallow base sticks more closely to the wire and leaves a greater amount of residue than one made from a vegetable base, either Palm or Olive Oil. From the letter I would assume that they are using either a vegetable oil base or a highly filled grease or tallow base and I believe that if they would use a titre tallow stock that there might be enough lubricant left on the wire to run nail wire economically on their high speed machines."

Answer No. 3

The Wire Association:

"We would suggest, in answer to your inquiry, that a mixture of equal parts pure turpentine and lard oil, applied with a felt roller from a reservoir, would be beneficial in solving your problem."

✦ ✦ ✦

Answer No. 4

The Wire Association:

"In reply to yours of December 7th, regarding difficulty in making nails, we would be glad to be put in closer communication with the inquirer. We would like to see samples of the wire before it goes through the nail machine and, of course, we would want to know the kind of steel from which the pointing dies are made and as a matter of fact I do not see how anybody can answer all of the questions called for here without paying a visit to the mill itself."

✦ ✦ ✦

Answer No. 5

The Wire Association:

"The first step would be to have an analysis made of the soap they are using at the present time. We would be glad to have our chemist do this and I am sure Ray Kline of Robertsons would also be glad to have it done. This might not be necessary if it happened to be a nationally known laundry soap, nevertheless it would be imperative to know exactly the kind of soap they are now using.

If the soap was found to be too lean (some superintendents like a rich soap, others a lean one) furnish them with a sample of rich soap which would leave but a skin on the wire.

They may be using a soap made from house grease, tallow or palm oil and it may be necessary for them to make a shift in the basic element in their soap before they get the required results. In other words a shift from palm oil soap to tallow soap or visa versa. The whole thing would seem to be the question of finding out what is wrong with the soap they are now using and correcting it by changing the soap."

✦ ✦ ✦

Answer No. 5A

The Wire Association:

Your problem of making nails from wire drawn on continuous machines is not new, but always interesting. I have little doubt it refers to Morgan-Connor machines. The trouble has been reported several times by their users. The twist in the wire is sometimes blamed.

Personally I believe the trouble is that as a rule a heavy sull coat makes the nail dies last longer, but cuts down the life of wire drawing dies **on high speed machines.** The trick is to hit a compromise that will do pretty well for both.

Some people have never encountered this trouble. They were using a light sull before they began high speed continuous drawing. Others lightened up on the coating to favor the wire machine, and some of them ran into nail die trouble. I don't know how to advise them, but should think they could get news from George Paff, or from John Delahanty of C. F. & I.

✦ ✦ ✦

Answer No. 6

The Wire Association:

The writer has definitely come to the conclusion that a different type of lubricant is needed for high-speed continuous machines than what is required on single-block machines. The fellow member that sent in this inquiry can no doubt readily appreciate this fact.

You have to lubricate the first die on continuous machines, and add no further lubricant for 2 or 3 more dies. Therefore, you must have a lubricant that will adhere to the wire up to the last die. In manufacturing nails he must have the lubricant remain on the wire, and an even better lubricant is required than on a single-block machines.

The writer would be only too pleased to go into the matter further with this gentleman if necessary and recommend to him the type of lubricant that should give the best results. The writer would like to know just what type of lubricant he is using, as we are familiar with all lubricants on the market for this type of drawing, and it is entirely probable that he will have to have a special lubricant.

As a matter of fact I have had a similar experience with another wire mill, and am very glad to say that we were of some help to them. They had trouble with the lubricant on their continuous machines not stand up.

As a suggestion we believe a Beeswax or Paraffine Wax embodied in a Palm Oil or a Palm Oil and Tallow Soap might solve his problem. If we can be of any further assistance, we would be very glad to hear from this fellow member.

✦ ✦ ✦

Answer No. 7

The Wire Association:

This is the first time that I have heard of any noticable difference in production of nails made from single spindle benches and continuous machines.

Unless your member is making very small brads, the 500 lbs. per grind on the cutters is a very small output. It is just possible that this member's trouble is due to his machinery being worn. If the parts carrying the cutter knives are at all loose, it will cause a rocking motion on the face of the cutters when in contact, which in turn will cause chipping of the cutting edges.

If the member is using the National machine, the pivot pins in the cutter levers are no doubt worn and need replacement.

If the member is using carbon steel on these cutters, he should change to high-speed steel.

We have seen machines working in mills where wire is being drawn by both methods and up to the present time have never heard that there has been any difference in the efficiency figures, on machines working on wire drawn on single spindle benches as against wire drawn by the continuous process.

Wire Association Questions and Answers

Answer No. 8

The Wire Association:

We do not know of any tests having to do with the effect of the rate of drawing of wire on the life of cutting knives on the nail machine. We would, however, expect that any increase in the rate of drawing would probably result in an increased "cold work" effect upon the wire. Numerous tests in connection with the flow of metal, both hot and cold, indicate that the power required to effect any given flow increases with the rate of working. Naturally, one would expect either a greater refinement upon the surface of the wire as a result of high speed drawing, or at least an increased depth of this hardness, which may account for the decreased tool life noted by your member.

Naturally, the conditions attendant upon high speed drawing would not only make it more difficult to retain the lubricant upon the wire, but would probably remove a greater amount of the coating of the wire also, and as this coating is in itself an excellent lubricant between the wire and the cutting knife, it is easy to understand where these three items together might considerably reduce the life of the cutting knives."

✦ ✦ ✦

Answer No. 9

The Wire Association:

"Regarding your letter wanting information on making nails from wire drawn on high speed continuous machines. We also had trouble making nails from this wire and finally gave up. We no longer use wire from these machines for making nails.

I would certainly like to know how this question is answered, as I know other mills are making nails from wire drawn on continuous machines."

✦ ✦ ✦

Answer No. 10

The Wire Association:

"We are not familiar enough with the actual manufacture of wire nails to venture an opinion that would be worth anything in a discussion of this kind. Our observation is that the bulk of the complaints from nail manufacturers to whom we have furnished machines may be traced to the use of hard wire. We have never heard of any complaint in reference to lubrication of the wire."

✦ ✦ ✦

Answer No. 11

The Wire Association:

"We suggest that if the knives do not last long enough, the only thing to do would be to grease the wire."

✦ ✦ ✦

Answer No. 12

The Wire Association:

"I am not prepared to say what effect the different lubricants have, but it is the general impression that nail wire drawn without a sull coat at high speeds will not cut off well in a nail machine and that the tool life is short. I am informed that this condition disappears when a sull coating is used."

The Wire Association is for the specific purpose of improving production methods. It was organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

The following inquiries were received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms or individuals sending in the inquiry, or of the men or firms replying are divulged without permission.

Join the Wire Association!

Question 1420--Cadmium Plating Of Steel Chemically.

The Wire Association:

"We understand that there is a method of cadmium plating steel chemically, that is, without the use of electricity. This method is similar to the ordinary copper or liquor finishes as applied to steel. If you have any information or can obtain any on this process, we would be very pleased to learn something about it."

✦ ✦ ✦

Answer No. 1

The Wire Association:

"There is one process available which consists of using a boiling solution of Cadmium Salt in non-metallic containers, which deposits a flash of Cadmium on iron or steel parts. This is only a flash and has no application in the field of rust protection, and the operation involved, such as heating the solution or boiling the solution in earthenware or glass vessels, of course, renders it rather inapplicable for most purposes.

Cadmium is, however, being applied to iron and steel wire and other products by hot dipping method similar to that of hot zincing, and if your clients have any specific problems along these lines we shall be very glad to entertain them."

✦ ✦ ✦

Question No. 1302--Tin Contaminated By Copper In Tinning Pots.

The Wire Association:

It is our practice to replace tin in our tinning pots for tinning wire when its contamination of copper builds up to a point of one-half of one percent. With such contamination the coating of tin is not satisfactory either for color or for adhesion. Can some of the members of the Wire Association give any helpful information on practices in this connection?

Answer No. 1

The Wire Association:

"It has been our experience that very little copper is alloyed with the tin. We have changed our tin but once in several years. If the coating is put on the wire properly before tinning, it does not seem to us that any material quantity should be removed in the tinning bath."

✦ ✦ ✦

Answer No. 2

The Wire Association:

"We find from our experience that when the tin has reached a point that it is saturated with the copper coating from running liquor finish and coppered wire, it is advisable to take out of the tin bath a volume equal to about one-sixth of the contents replacing this with virgin tin. We think that this practice will work out satisfactorily for your customer.

The molten tin which we removed is used for flaking tin afterwards used in the solution of Liquor Finished and Coppered Wire so that there is no waste of this metal.

We find, when we run our temperature about 600 F., that it discolors the finish making a yellowish cast; therefore, it is our practice to keep under this temperature in order to secure the bright silver finish desired."

✦ ✦ ✦

Answer No. 3

The Wire Association:

"In our tinning practice we have not found any detrimental condition due to copper being up to .80. Whether or not it is detrimental after it goes over .80 we do not know. As you know we tin all classes of High Carbon and Alloy wires in sizes ranging from .004 to .150."

✦ ✦ ✦

Answer No. 4

The Wire Association:

"We wish to advise that we allow our tin to remain in the tinning pot until it is contaminated with copper to the extent of 2%, and we have never known this to be harmful, in fact we know of some concerns letting this go until 3%, but we try to be on the conservative side."

✦ ✦ ✦

Answer No. 5

The Wire Association:

"It has been our practice to cool our tinning pots down every day to the point where copper-tin alloy will crystallize out and remove the crystallized alloy, filling out with new tin.

This practice was based upon an investigation we made a number of years ago which indicated the considerable solubility of copper in molten tin."

✦ ✦ ✦

Answer No. 6

The Wire Association:

"Our experience with contaminated tin is about as indicated in your letter.

However, this contamination may not be the principal cause of trouble as there may be other difficulties in his tinning methods which cause unsatisfactory color or lack of adhesion."

A Review of Recent Wire Patents

No. 1,896,475, ELECTRIC CONDUCTOR, Patented February 7, 1933, by Edwin L. Andrew of Rome, New York, assignor to General Cable Corporation of New York, N. Y., a Corporation of New Jersey.

The invention covers an electric cable having a number of separate wire conductors located within a single casing or sheath and is concerned particularly with providing a number of distinguishing marks which will not be obliterated by the protective material with which the cables are impregnated. The assembly includes a cable having a number of electrical wire conductors, a differentially colored metallic surface on each conductor, a layer of insulation surrounding each conductor and a cover surrounding the whole.

✦ ✦ ✦

No. 1,896,670, METHOD AND APPARATUS FOR FORMING WIRE COILS, Patented February 7, 1933, by Arthur H. Garst of Providence, Rhode Island.

The method is particularly provided for making substantially oblong wire coils having spaced substantially parallel coils, and comprises forming the wire into a series of oblong coils by continuously forming it under tension, imparting to each coil as it is formed the desired pitch by bending it obliquely outwardly the resired amount, compressing each half coil side beyond its desired set position to cause it to resiliently spring back to its desired flat position so as to shape each side of the coil to the desired shape and then pressing each oblong half coil transversely to the axis of the coil beyond its desired finished position so as to give the desired set degree of curvature to each respective half coil end.

✦ ✦ ✦

No. 1,896,674, WIRE DRAWING APPARATUS, Patented February 7, 1933, by James R. Longwell of Cleveland, Ohio, assignor to Carboloy Company, Inc., of Detroit, Michigan, a Corporation of New York.

An object of the invention is to provide an apparatus for drawing wire, wherein a lubricant is forced between the drawn wire and the drawing die, even when heavy drafts are taken.

✦ ✦ ✦

No. 1,896,826, WIRE STITCHING MACHINES, Patented February 7, 1933 by John Irving Nasmith of Eltham, England, assignor to Vickers-Armstrongs Limited of Westminster, England, a British Company.

This invention has exclusive reference to wire stitching machines in which the motion for feeding the wire for the stitches or staples is initially derived from the revolving feed cam and the arrangement is such that twisting forces set up in the actuation of the members, is reduced, according to the inventor, to a minimum.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

No. 1,897,412, METHOD OF WINDING CONVOLUTED SPRINGS, Patented February 14, 1933, by Arthur H. Adams of Yonkers, New York, assignor to Troy Laundry Machinery Company, Inc., of New York, N. Y., a Corporation of Delaware.

This method refers to the winding of the type of springs referred to in the preceding patent and comprises forming a length of wire in convolutions, and providing opposite sides of some of the convolutions with different net heights with respect to a plane which is perpendicular to the plane of the convolution and which forms an angle with an axis of the spring which is equal to the complement of the angle of skew, the opposite sides of the same dimensions recurring on the same side of the spring, consequently a flat surface is provided upon which the ironing pad is stretched and a smooth ironing surface resulting.

✦ ✦ ✦

No. 1,897,629, FLAMEPROOF WIRE, Patented February 14, 1933, by Henrik Boving of New York, N. Y., assignor to Western Electric Company, Incorporated of New York, N. Y., a Corparation of New York.

The invention relates to so-called flame-proof electrically insulated wire, the flame-proof coating consisting of selenium and sodium silicates applied to the electrical conductor.

✦ ✦ ✦

No. 1,897,970, WIRE-FEEDING AND CUTTING MACHINE, Patented February 14, 1933, by Alfred Hofmann of Palisade and Oswin Kanis of Lyndhurst, New Jersey, assignors to Alfred Hofmann Needle Works, Inc., of Union City, New Jersey, a Corporation of New Jersey.

Particularly, the invention is applicable to needle-making machines and the construction provides a single pair of cutter blades in lieu of the two disclosed in prior patent granted to the above patentees in U. S. Patent 1,696,-484. In order to insure uniform lengths of the wire lengths, they provide positively actuated means for limiting the action of the feeding mechanism.

✦ ✦ ✦

No. 1,898,102, METHOD AND MACHINE FOR COILING SMALL WIRE, Patented February 21, 1933, by Charles E. Sturgis of Rochester, New York, assignor of one-half to Waddel P. Andrus of Rochester, New York.

The small wire coils referred to are those used in flexible controlling cables in which the coils are moved longitudinally to control different devices and the inventor's method comprises forcing straight wire over a concaved surface or holding the portion engaging the surface against sidewise movement and causing the convolutions thus formed thereafter to travel over a number of concaved faces while holding the portion engaging these surfaces against sidewise movement.

✦ ✦ ✦

No. 1,898,286, NAIL WIRE GUIDE, Patented February 21, 1933, by Albert Bradley of Sterling, Illinois, assignor to Northwestern Barb Wire Company of Sterling, Illinois, a Corporation of Illinois.

Particularly, the invention relates to means for guiding nail wire into a nail making machine in proper juxtaposition to the nail forming dies so that the point and head of the nail will be properly formed with respect to the shank thereof. In the construction provided, improper positioning of the wire with respect to the point and head forming dies of the nail making machine is prevented.

✦ ✦ ✦

No. 1,898,741, SLIDE, Patented February 21, 1933, by Carl E. Peterson of Upper Montclair, New Jersey, assignor to Eastern Tool & Manufacturing Co., of Bloomfield, New Jersey.

This device is particularly adapted for straps on garments and the like and comprises wire bent to form a frame with a tongue bridging the frame and movable so that the slide may be placed on the strap without the necessity of threading the strap thru the slide.

✦ ✦ ✦

No. 1,899,449, APPARATUS FOR COATING WIRE, Patented February 28, 1933, by Walfred A. Wallsten of Worcester, Massachusetts, assignor to The American Steel and Wire Company of New Jersey, a Corporation of New Jersey.

An object of the invention is to provide a wire having a smooth shiny electroplated coating unobscured by a deposit of the electrolyte used, and another object of the invention is to prevent the electrolyte being carried away by the wire being plated.

✦ ✦ ✦

No. 1,899,559. MACHINE FOR MAKING WIRE CABLE, Patented February 28, 1933, by John C. Damon of Boston, Massachusetts, assignor to The American Brass Company of Waterbury, Connecticut, a Corporation of Connecticut.

The construction embodies a revolving head having guides for the individual wires making up the cable, a pair of die plates mounted to rotate with the head and extending transversely of the axis of is rotation, the plates being spaced from each other longitudinally of the direction of movement of the cable and provided with guides forming bending means for the wire, comprising notches extending inwardly from the peripheries of the plates.

Exports and Imports of Wire

Exports of iron and steel wire products in Jan., 1933 and Feb., 1933
(In gross tons)

	February 1933	January 1933	February 1932
Wire rods	2,035	711	2,468
Hoops, bands and strip steel	1,432	944	2,330
Plain black or galvanized iron or steel wire	500	390	1,045
Barbed wire and women wire fencing	1,775	892	1,189
Woven wire screen cloth	28	40	44
Wire rope	84	107	191
Insulated iron or steel wire and cable—see new analysis below			
Other wire and manufactures	140	173	223
Wire nails	479	601	476
Tacks	42	30	36
Other nails, including staples	299	121	178
Bolts, machine screws, nuts, rivets and washers	241	185	263
Total, these 11 classifications	7,055	4,194	8,443

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Concrete reinforcement bars	182	266	2,185
Hollow bars and drill steel	74	84	31
Merchant steel bars	1,812	1,664	3,195
Wire rods	918	1,196	843
Barbed wire	1,100	1,717	1,400
Round iron and steel wire	173	155	232
Telephone and telegraph wire		16	
Flat wire and strip steel	60	65	68
Wire rope and strand	137	127	129
Other wire	63	225	73
Hoops and bands	1,751	1,445	1,896
Nails, tacks and staples	558	1,007	797
Bolts, nuts and rivets	21	20	19
Total, these 13 classifications	6,849	7,987	10,868

Exports of Insulated Wire and Cable
February, 1933

	Lbs.	Value
Insulated Iron or Steel Wire and Cable	587	$ 95.00
Rubber Covered Wire	215,623	29,834.00
Insulated Copper Weatherproof Wire	45,364	5,133.00
Wire and Cable Telephone Cable	41,818	9,331.00
Other Insulated Copper Wire	59,564	11,731.00
Nickel-Chrome Electric Resistance Wire	10,839	12,532.00
Total, these 6 classifications	373,795	$68,656.00

EXPORTS of iron and steel products at 63,936 gross tons reached the highest total in February of any month since April, 1932, and with the exception of that month for any month since September, 1931. February, 1933, exportsfi were 58 per cent greater than those of the corresponding month of 1932 and averaged 2,283 tons daily as compared with 1,830 tons in January, 1933.

✦ ✦ ✦

IMPORTS, at 19,748 tons, were at their lowest ebb for any month since July, 1932, and were inferior to the receipts of February, 1932, by 26 per cent.

✦ ✦ ✦

THE largest single gain in exports recorded was that in scrap, 6,328 tons, with those in wire rods (1,324 tons) outstanding.

JAPAN was again the leading export market, here total of 36,454 tons including 34,001 tons of iron and steel scrap and 1,971 tons of wire rods. The Canadian total of 4,555 tons included 2,085 tons of hoops, 596 tons of steel bars, and 450 tons of cold rolled strip steel. All but 15 tons of the Italian total of 3,583 tons was scrap, while 996 tons of galvanized steel sheets was the principal item in the 2,726 ton trade with the Philippine Islands.

✦ ✦ ✦

THE outstanding products in the month's import trade were pig iron, merchant steel bars, hoops and bands, and structural shapes. Two-thirds—1,218 tons out of the 1,812 tons received—of the merchant steel bars were of Belgian origin, while the bulk of the 1,751 tons of hoops and bands imported came from Belgium (794 tons) and France (701 tons). The lion's share of the shapes trade—a total of 1370 tons came from Belgium.

✦ ✦ ✦

INCLUDED in the total from Belgium, of 4,364 tons, 1,218 tons was merchant steel bars, 794 tons was hoops and bands, and 531 tons was sheets, etc.,

✦ ✦ ✦

BARBED wire—1,029 tons—was the principal item in the 2,814—ton German total—349 tons of wire rods and 222 tons of hoops and bands also contributing heavily to the total. Of the French total of 1,528 tons, 701 tons was hoops and bands.

✦ ✦ ✦

CARD clothing receipts were much reduced at 3,331 square feet ($3,556) and were had from Germany (1,450 square feet, $1,637), the United Kingdom (1,774 square feet, $1,408), and Switzerland (107 square feet, $511).

✦ ✦ ✦

WIRE cloth and screening imports were smaller at 15,555 square feet, which total included 9,758 square feet coming from Germany, 3,332 square feet from Canada, 1,945 square feet from France, and 520 square feet from Sweden.

✦ ✦ ✦

FOURDRINIER wire receipts rose to 87,902 square feet and included 55,524 square feet from Austria, 21,097 square feet from France, 5,130 square feet from Belgium, 4,651 square feet from Germany, and 1,500 square feet from Sweden.

✦ ✦ ✦

IMPORTS of wire fencing and netting were, in the aggregate, rather smaller than in January.

✦ ✦ ✦

RECEIPTS of that galvanized before weaving increased slightly to 5,669,861 square feet from Germany, 1,872,600 square feet from the Netherlands, and 439,401 square feet from Belgium.

✦ ✦ ✦

FENCING and netting galvanized after weaving was imported in smaller amount in February than in January, the total of 1,465,250 square feet including 1,013,100 square feet from Germany, 228,150 square feet from Belgium, and 224,000 square feet from the Netherlands.

A Wire Pioneer Passes

Eugene H. Edwards, Wire Rope Manufacturer, Passes Away

EUGENE H. EDWARDS

ON February 21st, shortly after dinner, Mr. Eugene H. Edwards was stricken by an unexpected heart attack while driving to the St. Francis Yacht Club. Death followed almost instantly.

✦ ✦ ✦

MR. Edwards was a young man in mind and spirit as well as in body. Imbued with dynamic energy and tremendous tenacity of purpose that marks the true crusader and pioneer and with an unfaltering faith in his vision of the future of the West, his name will live in the industrial history of the Coast.

✦ ✦ ✦

MR. Edwards was born in San Francisco in the year 1880. At the age of 16 he entered the employ of Washburn-Moen Company, wire manufacturers, to work in the wire mill. When the American Steel & Wire Company took over Washburn-Moen, Mr. Edwards remained with the organization. He will be remembered by many for his numerous activities in the order, traffic, and sales departments at the old offices at "8 & 10 Pine Street" in the days before the fire in San Francisco. In 1904 he joined the newly formed Pacific Steel & Wire Company of Oakland and rose to the position of sales manager.

✦ ✦ ✦

DURING the days of reconstruction after the fire of 1906 his vision of the possibilities for building with the growing West received additional stimulation. The ever present urge to be moving ahead exerted itself more forcibly and Mr. Edwards' strong personal powers for organization came to the fore.

✦ ✦ ✦

IN 1908 he founded the E. H. Edwards Company with small offices and plant on Howard Street in San Francisco. His major product was salmon-trap netting and he acted as the local distributor for an Eastern wire rope manufacturer. From this start grew the present organization that bears his name with branches in Seattle, Portland and Los Angeles and distributors throughout the Mid-Continent oil fields, the Philippines and Hawaii and Pacific Coast and Mountain States.

THE operations of the original plant on Howard Street did not satisfy Mr. Edwards' energy and driving force and the keen desire for a complete control of the quality and service of his products from start to finish led him to build the first wire mill on the Coast at South San Francisco on the site of the present plant. The drawing and fabricating of high-grade wire rope became the major operation, although the plant continued with the manufacture of netting.

✦ ✦ ✦

HIS unswerving belief that steel wire could be drawn on the Coast and fabricated into rope to meet the severe requirements of Western logging, mining and oil-well drilling carried him into this new field in spite of the many obstacles that stood in his path. This pioneering spirit would not be denied and a definite contribution was made to the growth of Western Industry and the Western users of wire rope were given a real service.

✦ ✦ ✦

WIRE and Wire Rope were his life. The belief that "it can be done" never wavered during his entire business career. Without detours or deviation during booms and depressions he forged ahead on his chosen path that he knew so well.

✦ ✦ ✦

DURING the earlier years he was personally in contact with the trade as well as the manufacturing but during the last de-

cade he gave his manufacturing ingenuity and organization genious greater play and built an organization that was, and is, ably carrying out his pioneering ideas.

✦ ✦ ✦

HE built solidly and well; financially as well as in manufacturing and sales. The organization founded and trained in the manufacturing and sale of wire products will continue as he wished it, uninterrupted, under the guidance of men whom he has personally trained and who are thoroughly familiar with all the details of the business, the policies and ideals of Mr. E. H. Edwards.

✦ ✦ ✦

'Round The World With the Wire Industry

(*Continued from page 143*)

where periodic conferences between the representatives of the affiliated interests are convened for the purpose of exchanging views and ideas and for considering practical suggestions.

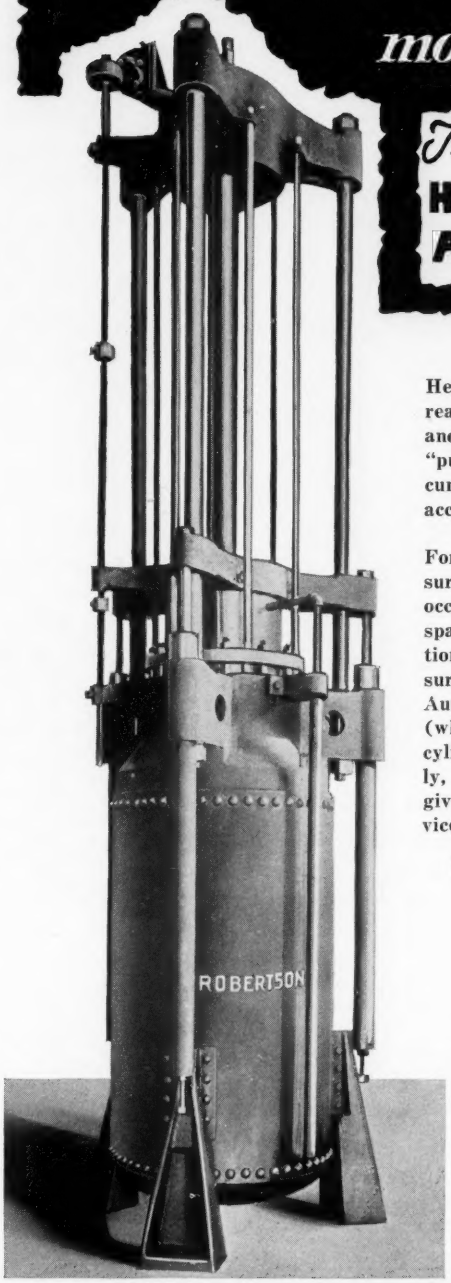
An important outcome of these regular conferences was the international competition, organized some time ago by the Bureau and recently concluded, in which inventors were asked to submit suggestions for new uses of aluminum and its alloys and suggestions for the improvement of manufacturing methods. Over 500 papers were submitted, seven being awarded prizes.

The International Bureau now proposes to carry out a widespread propaganda campaign. The electrical section is to push the claims of the aluminum high-tension transmission line and to strive for the world-wide introduction of the damping device invented in Germany for preventing the breaking of lines, and to urge the substitution of aluminum in place of lead as an armoring for cables.

The Bureau is investigating an improved process for protecting the surface of aluminum from corrosion, which would appear to fulfil the urgent requirement of cheapening the existing process.

An Accumulator
~that's "entirely different"
and
more efficient

The ROBERTSON
HYDRO-PNEUMATIC
ACCUMULATOR



Here is an Accumulator which is really so revolutionary in design and construction that it really "puts to shame" the old types of cumbersome, slow, space taking accumulators.

For 1500-6000 lbs. Hydraulic Pressure, the Robertson Accumulator occupies the very minimum of space,—requires no heavy foundations,—operates at low air pressure (175 lbs.),—is equipped with Automatic Auxiliary Compressor (which maintains pressure in the cylinder and storage tanks). Finally, an accumulator that always gives Efficient, Trouble-free Service.

SEND FOR LITERATURE

Note: Robertson makes all types of lead-encasing machinery required by rubber hose and electrical cable makers: Extrusion Presses, Hydraulic Pumps, Melting Furnaces and Pots, Dies and Cores, also Lead Sheath Stripping Machines, and Hydro-pneumatic Accumulators.

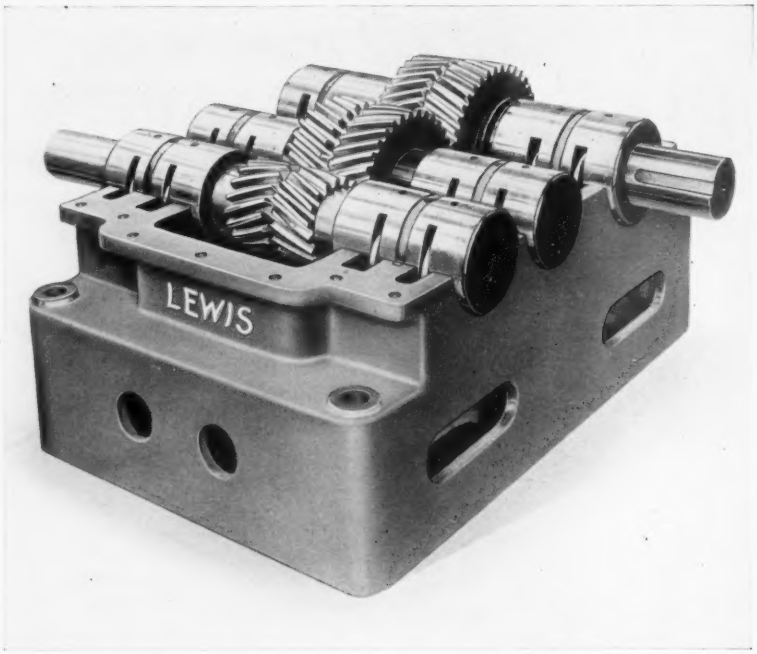
Robertson lead encasing equipment is virtually a standard thing here and abroad, where in many cases it is used exclusively.

John ROBERTSON CO. INC.
Pioneers~Since 1858
125-137 Water Street Brooklyn, N. Y

LEWIS

+ + + + + HIGH SPEED GEAR SET

FOR CONTINUOUS ROD MILL



Lewis High Speed Gear Sets are in use where quality and efficiency really count. The largest and most up-to-date rod mill unit in the world utilizes Lewis Gear Sets for driving its roll stands.

Lewis gear housings are of two piece type with special alloy forged steel herringbone cut tooth gears running in babitted shell type or roller bearings. One Lewis gear set is used for driving two roll stands which is a special feature for controlling roll speeds when driven by either individual motors or bevel gear drives. Lewis gear sets are totally enclosed and gears and bearings run continuously in oil.

Lewis Engineers will gladly cooperate with you in designing special machinery to meet your problems.

THE LEWIS FOUNDRY & MACHINE CO.
BOX 1591
PITTSBURGH, PA.

Electric Tube Locates Cracks In Wires

(*Continued from page 139*)

either or both of which may be used as test coils through which to pass the tubing. With a good section of tubing in the test coils, the oscillators are both tuned to the same frequency. Then, as the tubing is passed through the coils, a flaw will change the induced current sufficiently to change the frequency of one of the oscillators and cause a beat note in the loudspeaker and a deflection of the meter.

The equipment in its present form detects local flaws and sudden changes in characteristics of the material. By using one test coil instead of two, however, it may be used to detect gradual changes in characteristics or to compare the material with a standard. The device may be used to operate a loudspeaker, a meter, or a thyratron tube and relay.

✦ ✦ ✦

A Review of Recent Wire Patents

(*Continued from page 148*)

No. 1,901,920, METHOD OF AND APPARATUS FOR DRAWING WIRE, Patented March 21, 1933, by Samuel McMullan of Downers Grove, Illinois, assignor to Western Electric Company, Incorporated of New York, N. Y., a Corporation of New York.

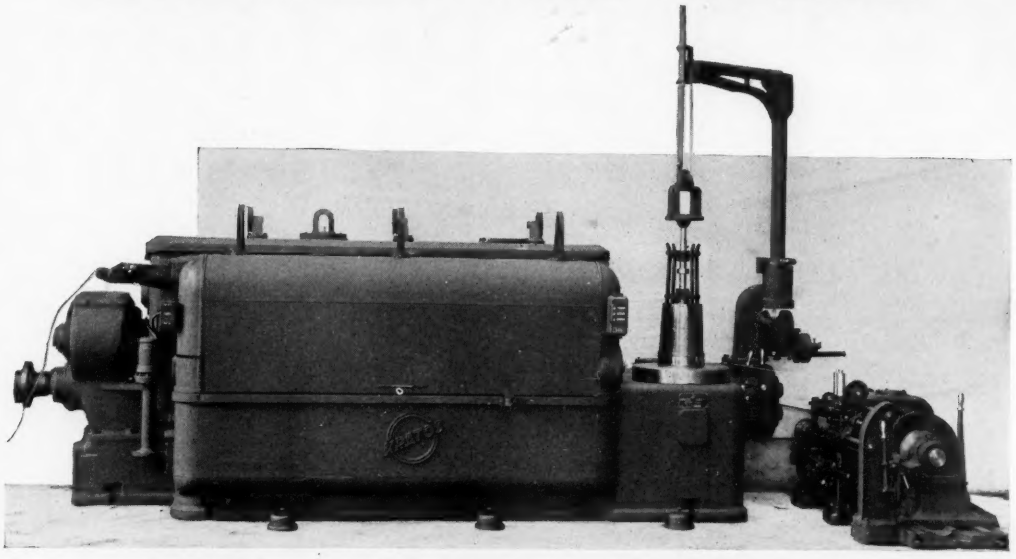
This invention pertains to the manufacture of wire inserted glass by the continuous process in which the reinforcing wire is drawn thru the molten metal prior to becoming incorporated in the glass sheet at the forming pass. The principal object of the invention is to eliminate defects in the glass due to shrinkage stresses and foreign matter adhering to the wire, by preheating the wire before it is introduced into the molten metal.

✦ ✦ ✦

No. 1,900,792, NONINDUCTIVE CABLE, Patented March 7, 1933, by Carl P. Brodhun of Wilkes-Barre, Pennsylvania, assignor to The Okonite Company of Passaic, New Jersey, a Corporation of New Jersey.

In the construction of this electric cable, the ordinary metallic bands encasing the cable are dispensed with and their places are taken by a number of protecting strips impregnated with a phenol condensate, resulting in strips of stiff bendable non-metallic, non-conducting material. These strips are wound in crisscross relation around the conductors. It is claimed there is a considerable saving in weight since the protective strips employed weigh considerably less than the ordinary metallic bands.

The KRATOS HIGH PRODUCTION CONTINUOUS WIRE MACHINE



MODEL K A-1 FOR FIFTEEN DIES

Draws From No. 2 Copper Rod to 20 B & S Gauge at 3500 F.P.M. Finishing Either on Block or Spool

✦ ✦ ✦

These Machines, which, Together with Corresponding Models for Intermediate and Finest Sizes, Embody the Practical Experience of Twenty Years, are Now Built in the United States.

For Details and Prices Address

Kratos-werke Aktiengesellschaft

GRÜNA i. SA. GERMANY

No. 1,900,962, CONTINUOUSLY LOADED TELEGRAPH CABLE, Patented March 14, 1933, by John Ricketts Vezey of London, England, assignor to International Standard Electric Corporation, of New York, N. Y., a Corporation of Delaware.

This submarine cable construction comprises a number of loaded sections and a number of unloaded sections, wherein one loaded section is joined to another by one of the unloaded sections, and the length of loaded sections is progressively less towards the end of the cable. It is claimed by this arrangement the cable loading system may be more readily balanced or simulated by an artificial line.

✦ ✦ ✦

No. 1,901,405, MACHINE FOR SHAVING AND SLOTTING SCREWS, Patented March 14, 1933, by Frank E. Newton of Hartford, Connecticut

The object of the present invention is to so relate the movement of the screw threads and the positions and actions of the cutting tools, that there will be a reduction in the distance of the head movements and in the time of the head dwells, with the result that the speed of operation may be increased with a saving power, decrease in wear of the elements, and increase in the productivity of the machine.

✦ ✦ ✦

No. 1,901,477, FABRIC WELDING MACHINE, Patented March 14, 1933, by William S. Southwick of Lynn, Massachusetts, assignor to Thomson-Gibb Electric Welding Company of Lynn, Massachusetts, a Corporation of Massachusetts.

Particularly, the invention is adapted for the drawing of non-ferrous wire. In accordance with the general features of the invention, a wire whose cross section it is desired to reduce is advanced from a supply spool and passed thru a number of reducing dies while maintained at an annealing temperature. The supply spool of wire and the wire drawing apparatus proper are maintained at substantially the same temperature.

✦ ✦ ✦

No. 1,902,493, WIRE MAKING PROCESS, Patented March 21, 1933, by Christian Dantsizen of Schenectady, New York, assignor to General Electric Company, a Corporation of New York.

More particularly, the invention relates to a method of putting on a rust coat and lime on the rod prior to the drawing operation, the method consisting of making the rod employed in the operation, the anode in a bath of lime and water, passing current therethru, drying the rod and drawing the rod thru a

(*Please turn to page 155*)

Registry of Used Wire Machinery

Conducted by

Dunscomb Associates

BOX 320, C/O WIRE AND WIRE PRODUCTS
17 EAST 42nd ST., NEW YORK, N. Y.

We Offer—Subject to Prior Sale—The Following Used Wire Mill Machinery

No. 230

Morgan Rod Bench
6-22" Friction Blocks
Gear Drive and Motor
2 Pointers
Block Speeds, 28 to 34 R. P. M.

Send in Your Listing
LET US KNOW
WHAT YOU NEED

No. 239

6 Block
Morgan Rod Bench
with Gear Drive
½" Capacity

No. 231

Fifteen Frame for Wet Drawing
10 Blocks 12" Dia.
Block Speed 35 R. P. M.
McMahon Pinions

No. 237

Two Electric Resistance Pointers
O & J Capacity
.148 Wire

No. 240

10 Block Wet Frame
12" Blocks—Capacity .125
Music Wire
Cut Gears and Pinion Clutches

No. 232

Grasshopper Type Crane
Hydraulic 10 Foot Radius
10½" Mast
9" Cylinder

No. 238

Five Round
Acid Vats—66" Diameter

No. 260

Rivet Slitting Machine
Slightly Used

WE HAVE BUYERS FOR THE FOLLOWING

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Nielson
B2 Power Press
For Making
Flat Wire Pointed Staples

No. 252

One Roller Type Straightener
For Round Wire
Rolls on a Horizontal and Vertical Plane

No. 254

Several No. 1 Waterbury
Cone Machines

No. 251

S & C Machine
¼" or Larger to Cut
36" Lengths—
No Rotary Straightener

No. 253

Straightening and Cutting Machine For
Florist Wire

No. 255

Waterbury Farrel
Wet Drawing Machines
for Solder Wire
2 Rolls—1 to 2 HP

If You Have Used or Surplus Machinery For Sale, Write for Details of our Plan. No Charge For Listing.

APPRAISALS ✦ ✦ ✦ STEEL AND NON-FERROUS ✦ ✦ ✦ INSPECTIONS

✦ ✦ ✦

FOR DETAILS WRITE

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BOX 320, C/O WIRE AND WIRE PRODUCTS 17 EAST 42nd ST., NEW YORK, N. Y.

REGISTRY OF USED WIRE MILL MACHINERY

Haveg Appoints Beard

John Beard, formerly with the Sharples Specialty Company of Philadelphia is now associated with the Haveg Corporation of Newark, Delaware. Mr. Beard graduated from Lehigh University in 1920 and since that time has been engaged in technical sales work.

The Haveg Corporation is an associate of the Continental-Diamond Fibre Company also at Newark, Delaware. The Haveg Corporation has just completed a new plant for the manufacture of corrosion resistant chemical equipment.

Haveg was developed in Germany in 1922 and since then has been used extensively for the manufacture of all types of corrosion resistant chemical equipment. The rights to manufacture Haveg in this country were recently acquired by the Continental-Diamond Fibre Co., and the Haveg Corportion was formed.

✦ ✦ ✦

Watermarking Paper

(*Continued from page 135*)

ing industry is a most important part of the business and is the subject of earnest thought on the part of the whole wire industry. Only recently an effort has been made to have the warp wires rolled flat before the wire is woven. This would prevent the present prominence of knuckles which are so subject to wearing and scoring the suction boxes as this reacts on the wire and shortens its life.

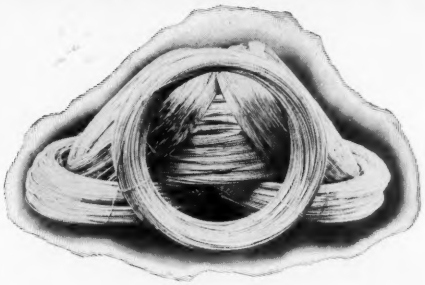
✦ ✦ ✦

IT has been stated that a rolled wire will shed 25% more water than an unrolled wire of like mesh. Superintendents are often at their wits ends to determine the causes which shorten the life of wires and to their surprise have found that wire life is much shorter in the summer than in the winter.

✦ ✦ ✦

BOTH brass and bronze wires are used so that a chemical analysis may tell if the mixture of the wire is correct and by a study of the grain size it can be determined if the annealing temperature is correct.

SILVER BRIGHT GALVANIZED



We furnish this highly finished galvanized wire to meet your requirements as to coating, tensile strength, bend test, etc. Packed in coils or straightened and cut to length. Our organization will be glad to offer its long experience in wire problems toward the betterment of your product or a reduction in its cost. Call on us.

✦ ✦ ✦

We make a complete line of nails in various sizes and types. Also the following kinds of wire:

BRIGHT BASIC
COPPER-BEARING
ANNEALED
LIQUOR FINISH

TINNED
COPPERED
"GALVANNEALED"

ROPE WIRE
TELEPHONE WIRE
SPRING WIRE
WELDING RODS

KEYSTONE STEEL & WIRE COMPANY
3000 Industrial Street PEORIA, ILL.

The LYON MEASURING MACHINE
WILL CHANGE YOUR WASTE TO PROFIT

by eliminating the material waste of excess footage. Supply your product to the trade with guaranteed measurement—not an estimate or an approximate figure—but exact linear measurement. Avoid the danger of short measure and at the same time eliminate excess footage. Change waste of material to dollars of profit through the mechanically exact measurement of the Lyon Measuring Machine.

EXTREME PRACTICAL ACCURACY

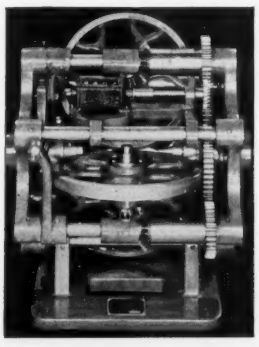
WIRE - ROPE - CABLE - CORD
BARE - INSULATED - ARMORED - B-X
TWISTED PAIR - ENAMELLED - CONDUIT

Write for additional information

LYON MEASURING MACHINE DIVISION

BARBOUR WELTING COMPANY

BROCKTON, MASS.



Patent Pending

STEELSKIN

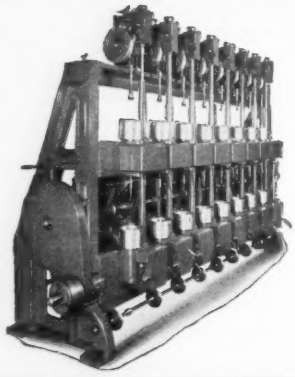
REG. U. S. PAT. OFFICE

For High or Low Carbon Wire

WIRE DRAWING SOAPS

Established 25 years.

R. H. MILLER CO., Inc. Homer, N. Y.



WHY PAY MORE?

When wire can be insulated at a lower cost on the AIMCO line of insulating machinery than on any other machines, the initial investment being less with consequent lower depreciation and maintenance charges, and the labor cost per pound of finished wire running remarkably low.

EST. 1855 AIMCO INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

PHILADELPHIA PENNSYLVANIA U.S.A.

517 West Huntingdon St. Philadelphia, Pa.

A Home Away from Home

With the elaborate provision of a great organization available at the Mount Royal Hotel, there is lost none of that personal touch so dear to those away from home. At the Mount Royal Hotel as cheery a hospitality and as courteous a welcome await the stranger as at the little wayside inn where his coming is the event of the day.

VERNON G. CARDY, Managing Director.

Mount Royal Hotel

MONTREAL

General Cable Corp. Closes Fort Wayne Plant

THE General Cable Corporation plant of Fort Wayne, suspended operations March 22. **Walter Robbins**, chairman of the board, and **J. C. Ward, Jr.**, general works manager, are the out-of-town officials who conferred with the managers at Fort Wayne after an inspection of the plant. Mr. Ward stated that the demand for the type of products produced at the Fort Wayne plant was abnormally low, one of the reasons for suspending operations. He also stated that he hopes to reopen the plant as soon as business conditions improve.

✦ ✦ ✦

IT was announced that **Herman Arber** will continue to head the company's manufacturing group and that **George B. Horn** will continue in charge of coil engineering and inspection. **Henry Crowe** of the Fort Wayne organization, will continue in charge of wire engineering and inspection. **P. D. Rensenhouse**, Fort Wayne branch manager, has been selected to join the executive group of the company, with offices in New York City. He will be assisted by Max Roesler, accountant here.

✦ ✦ ✦

Anaconda Wire Plant In California To Increase Capacity

Anaconda Wire & Cable Co., of California, announces plans to increase the size of its operations at its Orange, California plant. Equipment for the manufacture of bare and stranded copper conductors has been selected and will arrive shortly at Orange. Anaconda is prompted to make this move because of a large order recently received from the Metropolitan Water District and the expectancy of additional business in connection with the Boulder Dam project.

Newman Wire Co. and J. D. Crosby Co., Consolidate Interests

THE C. Newman Wire Company, Inc., and its manufacturing affiliate, **J. D. Crosby Company,** specialists in cold rolling, low carbon, high carbon, alloy and stainless steels, have consolidated their interests effective immediately. Their selling and manufacturing activities will be conducted under the name Newman-Crosby Steel Corporation. The executive offices and works will be located at Pawtucket, R. I., and the general sales offices at 25 Church Street, New York City. C. Newman is president of the Newman-Crosby Steel Corporation and Robert G. Ashman, general manager.

✦ ✦ ✦

"Nichrome" V Announced by Driver-Harris

Driver-Harris Company announces a new series of "Nichrome" alloys, to be known as "Nichrome" V. This is the very latest step in the Driver-Harris development of nickel-chromium alloys.

More than twenty-five years ago the first of the "Nichrome" series was developed by Driver-Harris Company and since that time "Nichrome" has been the standard of comparison for heating element material.

These years of experience in dealing with problems of heat resistance makes the D-H Technical Staff especially equipped to meet the requirements for longer life, quicker heating and greater overload capacity.

This growing demand for increased speed, high temperatures and longer life has led to the introduction of "Nichrome" V.

The performance of "Nichrome" V on the life test board far exceeded the expectations of the D-H Engineers inasmuch as it was substantially more than that of any material heretofore furnished, marking a forward stride in the progress of "Nichrome" alloys.

BALLOFFET

The Quality Diamond Dies

1870 1933

BALLOFFET DIAMOND WIRE DIES CO. INC.,
13-15 East 22nd Street, New York City
Factories in France: Lagnieu-Cluses-Trevoux

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PATENT LAW OFFICES
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ZINC STRIP WIRE
THE PLATT BROS. & CO.
WATERBURY, CONN.

Wire and Wire Products Buyers' Guide and Year Book of the Wire Association
1933 Edition Ready for Delivery
$5.00 per COPY

EFFICIENT PICKLING
REQUIRES "RODINE"
RODINE, SAVES ACID AND METAL. Prevents over-pickling. Minimizes acid brittleness and acid fumes.
Samples and Directions sent on request.
AMERICAN CHEMICAL PAINT CO.
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NOTICE!
MANUFACTURERS OF WIRE MILL EQUIPMENT AND SUPPLIES

IF you have a product of unquestioned merit, requiring the highest type of intelligent, dignified and effective representation among the Wire Mills in the Eastern States, it will be of advantage to you to investigate the qualifications I have to offer.

THREE years of successful Sales-Engineering, plus a wide acquaintance among the Industry's chief executives should merit your consideration and lead to a mutually agreeable connection.

REFERENCES as to character and ability cheerfully furnished on request to firms of high standing in the trade.

WIRE & WIRE PRODUCTS: Box No. 225

EXPERIENCE is the name that we give to our follies. It is the record of pain, seldom the story of pleasure. Experience is the extract of much suffering; therefore, experience should have the advantage of much light.

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Specializing in Galvanizing Plants Designed and Installed
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Specializing in manufacture of insulated wire and cable.
Modern equipments and plants designed and installed.
Development work on new machinery, methods and processes.
Practical engineering advice from rod mill to finished product.
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Kenneth B. Lewis
CONSULTING ENGINEER
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43 Midland St. Worcester, Mass.
Phone 5-6033

Broden Construction Co.
Wire Mill and Cold Rolling Equipment
10255 Harvard Ave.
CLEVELAND, OHIO

WIRE MILL EQUIPMENT
MORGAN CONSTRUCTION CO.
WORCESTER, MASS.

Wire Mill Equipment, Stranding, Insulating, Drawing, Welding
Thomson-Judd Wire Machinery Co.
Subsidiary of
Thomson-Gibb Electric Welding Co.
Lynn, Massachusetts.

New Beryllium Copper Alloy

THE Riverside Metal Company, Riverside, N. J., started production of beryllium copper, a heat treatable copper alloy in every variety of sheet, strip, wire and rod.

✦ ✦ ✦

THE beryllium copper alloy possesses many of the advantages of steel and copper as well as their excellent physical and mechanical properties. Their physical properties are increased to an extraordinary degree by heat treatment, an instance beng cited of a hard drawn beryllium copper wire containing less than 2.5% beryllium, having its tensile strength from 108,000 pounds per square inch to 190,000 pounds per square inch.

✦ ✦ ✦

SOME of the striking and outstanding tests that have already been made give a hint of its possibilities. A test on plate springs showed a failure of ordinary metals of about 400,000 bends while a recent test on beryllium, a copper plate spring, showed 10,000,000 bends without a fracture. The test of a snap spring between relay contacts showed a life of 500,000 to 1,200,000 operations using standard spring alloys compared with 11,000,000 operations without failure when beryllium copper was used. Heat treated chisels of beryllium copper were brought to a Brinell hardness of 375 and in tests severed the heads of ¼-inch steel rivets and cut through wrought iron pipe .140 wall.

✦ ✦ ✦

TO acquaint users with the advantages of this new product, and information booklet entitled "Riverside Beryllium Copper", has been prepared by the Riverside Metal Company, Box 160, Riverside, Burlington County, N. J., where copies may be obtained.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames—16" Frames, 8" Frames —Take-Up Frames, Wire Pointers—Puller Tongs.
General Castings for Wire Mill use.
Circulars on Request.
E. J. Scudder Foundry & Machine Co.
Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINERY
FOR ALL SIZES, SHAPES AND KINDS OF WIRE
The F. B. Shuster Co.
New Haven, Conn.
Straightener Specialists Since 1866

John Royle & Sons
Paterson, New Jersey
Makers of Extruding Machines and Hose Looms.

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WIRE DIE CORPORATION
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Famous Wire Drawing Diamond Dies
250 EAST 43rd ST., N. Y. CITY

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ANNEALING FURNACES
See Furnaces—Various Headings

ANNEALING POTS AND BOXES
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Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

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Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.

CHROME NICKEL—Construction
National Wrought Iron Annealing Box Co., Washington, Pa.

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Broden Construction Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

COILERS—Sheet and Wire
H. J. Ruesch Machine Co., Newark, N. J.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Composition
Vianney Wire Die Works, New York, N. Y.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Vianney Wire Die Works, New York.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Corp., New York.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Vianney Wire Die Wks., N. Y.

DIES—Recutting and Repolishing Machine
Vianney Wire Die Works, New York, N. Y.

DIES—Rod and Tube Drawing
Carboloy Co., Inc., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Master Wire Die Co., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Carboloy Co., Inc., Newark, N. J.
Driver-Harris Co., Harrison, N. J.
Master Wire Die Co., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES—
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

ENGINEER—Consulting Wire Mill
Jagielski, Otto, Yonkers, N. Y.
Lewis, Kenneth B., New York, N. Y.

EYELETS—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FURNACES—Annealing
Electric Furnace Co., Salem, O.

FURNACES—Automatic
Electric Furnace Co., Salem, O.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.

FURNACES—Electric
Electric Furnace Co., Salem, O.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
John Robertson Co., Brooklyn, N. Y.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.

FURNACES—Wire
Electric Furnace Co., Salem, O.

GALVANIZING KETTLES—
National Wrought Iron Annealing Box Co., Washington, Pa.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Wm. M. Parkin & Co., Pittsburgh, Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller Co., Homer, N. Y.

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American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
New England Butt. Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Machinery Co., Philadelphia, Pa.
Fred'k M. Conran, Newark, N. J.
New England Butt Co., Providence, R. I.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Fred'k M. Conran, Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Fred'k M. Conran, Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Coilers
Broden Const. Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
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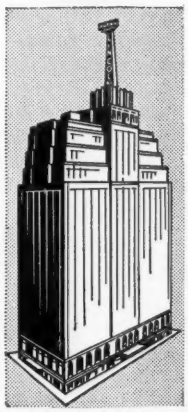

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Broden Construction Co., Cleveland, O.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Measuring Wire & Cable
Lyon Measuring Machine Division of Barbour Welt'ng Co., Montello, Mass.
New England Butt. Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
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H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Rod Mill
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Fred'k M. Conran, Newark, N. J.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Lewis F'dry & Machine Co., Pittsburgh, Pa.

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Lewis F'dry & Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
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John Royle & Sons, Paterson, N. J.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
John Royle & Sons, Paterson, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila Pa.
Broden Construction Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Fred'k M. Conran, Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening Hollow Wire
Fred'k M. Conran, Newark, N. J.

MACHINERY—Stranding
Fred'k M. Conran, Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Welding Wire
F. B. Shuster Co., New Haven, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Fred'k M. Conran, Newark, N. J.
Kratos-werke Aktiengesellschaft Gruna 1, SA. Germany
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

PACKING—Metallic Fibre
Hudson Wire Co., Ossining, N. Y.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.

PICKLING AND PLATING TANKS
Haveg Corporation, Newark, Del.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

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E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., **Worcester, Mass.**

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John Robertson Co., Brooklyn, N. Y.

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R. B. Hayward Co., Chicago, Ill.
Watson Machine Co., Paterson, **N. J.**

ROLLING MILLS—See Machinery—Rolling Mill

ROLLS—
Lewis F'dry & Machine Co., Pittsburgh, Pa.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.

SPOOLS—Aluminum Alloy
Lestershire Spool Co., Johnson City, N. Y.

STEEL PLATE CONSTRUCTION—
National Wrought Iron Annealing Box Co., Washington, Pa.

STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

TANKS—Compound
Haveg Corporation, Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Steel Plate
National Wrought Iron Annealing Box Co., Washington, Pa.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, **N. J.**

VULCANIZERS
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, **N. J.**

VULCANIZING PANS
American Insulating Mach'y Co., Phila., **Pa.**

WIRE—Enameled For Coils
Winsted Insulated Wire Co., Winsted, Conn.

WIRE—Manufacturers
Keystone Steel & Wire Co., Peoria, Ill.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Insulated Wire Co., Winsted, Conn.

WIRE—Steel—Also Coppered Steel—Also Glavanized Steel
Keystone Steel & Wire Co., Peoria, Ill.

WIRE AND STRIP—Zinc
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